

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH, N.C.

0012DEL\_P28  
1001ADD\_P28  
1002ADD\_P28

PROPOSAL

**INCLUDES ADDENDUM No. 2 DATED 05-23-2018**  
**INCLUDES ADDENDUM No. 1 DATED 05-04-2018**

DATE AND TIME OF BID OPENING: **MAY 29, 2018 AT 2:00 PM**

CONTRACT ID C204058  
WBS 44475.3.6, 44475FHWA.3.1

FEDERAL-AID NO. STATE FUNDED, STBGDA-1001(79)  
COUNTY MECKLENBURG  
T.I.P. NO. P-5705BA, P-5705BB  
MILES 0.742  
ROUTE NO.  
LOCATION CHARLOTTE GATEWAY STATION.

TYPE OF WORK GRADING, DRAINAGE, PAVING, STRUCTURES, AND ARCHITECTURE.

**NOTICE:**

ALL BIDDERS SHALL COMPLY WITH ALL APPLICABLE LAWS REGULATING THE PRACTICE OF GENERAL CONTRACTING AS CONTAINED IN CHAPTER 87 OF THE GENERAL STATUTES OF NORTH CAROLINA WHICH REQUIRES THE BIDDER TO BE LICENSED BY THE N.C. LICENSING BOARD FOR CONTRACTORS WHEN BIDDING ON ANY NON-FEDERAL AID PROJECT WHERE THE BID IS \$30,000 OR MORE, EXCEPT FOR CERTAIN SPECIALTY WORK AS DETERMINED BY THE LICENSING BOARD. BIDDERS SHALL ALSO COMPLY WITH ALL OTHER APPLICABLE LAWS REGULATING THE PRACTICES OF ELECTRICAL, PLUMBING, HEATING AND AIR CONDITIONING AND REFRIGERATION CONTRACTING AS CONTAINED IN CHAPTER 87 OF THE GENERAL STATUTES OF NORTH CAROLINA. NOTWITHSTANDING THESE LIMITATIONS ON BIDDING, THE BIDDER WHO IS AWARDED ANY FEDERAL - AID FUNDED PROJECT SHALL COMPLY WITH CHAPTER 87 OF THE GENERAL STATUTES OF NORTH CAROLINA FOR LICENSING REQUIREMENTS WITHIN 60 CALENDAR DAYS OF BID OPENING.

**BIDS WILL BE RECEIVED AS SHOWN BELOW:**

**THIS IS A RAIL PROPOSAL**

**5% BID BOND OR BID DEPOSIT REQUIRED**

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**PROPOSAL FOR THE CONSTRUCTION OF  
CONTRACT No. C204058 IN MECKLENBURG COUNTY, NORTH CAROLINA**

Date \_\_\_\_\_ 20 \_\_\_\_\_

**DEPARTMENT OF TRANSPORTATION,  
RALEIGH, NORTH CAROLINA**

The Bidder has carefully examined the location of the proposed work to be known as Contract No. **C204058** has carefully examined the plans and specifications, which are acknowledged to be part of the proposal, the special provisions, the proposal, the form of contract, and the forms of contract payment bond and contract performance bond; and thoroughly understands the stipulations, requirements and provisions. The undersigned bidder agrees to bound upon his execution of the bid and subsequent award to him by the Board of Transportation in accordance with this proposal to provide the necessary contract payment bond and contract performance bond within fourteen days after the written notice of award is received by him. The undersigned Bidder further agrees to provide all necessary machinery, tools, labor, and other means of construction; and to do all the work and to furnish all materials, except as otherwise noted, necessary to perform and complete the said contract in accordance with *the 2018 Standard Specifications for Roads and Structures* by the dates(s) specified in the Project Special Provisions and in accordance with the requirements of the Engineer, and at the unit or lump sum prices, as the case may be, for the various items given on the sheets contained herein.

The Bidder shall provide and furnish all the materials, machinery, implements, appliances and tools, and perform the work and required labor to construct and complete State Highway Contract No. **C204058** in **Mecklenburg County**, for the unit or lump sum prices, as the case may be, bid by the Bidder in his bid and according to the proposal, plans, and specifications prepared by said Department, which proposal, plans, and specifications show the details covering this project, and hereby become a part of this contract.

The published volume entitled *North Carolina Department of Transportation, Raleigh, Standard Specifications for Roads and Structures, January 2018* with all amendments and supplements thereto, is by reference incorporated into and made a part of this contract; that, except as herein modified, all the construction and work included in this contract is to be done in accordance with the specifications contained in said volume, and amendments and supplements thereto, under the direction of the Engineer.

If the proposal is accepted and the award is made, the contract is valid only when signed either by the Contract Officer or such other person as may be designated by the Secretary to sign for the Department of Transportation. The conditions and provisions herein cannot be changed except over the signature of the said Contract Officer.

The quantities shown in the itemized proposal for the project are considered to be approximate only and are given as the basis for comparison of bids. The Department of Transportation may increase or decrease the quantity of any item or portion of the work as may be deemed necessary or expedient.

An increase or decrease in the quantity of an item will not be regarded as sufficient ground for an increase or decrease in the unit prices, nor in the time allowed for the completion of the work, except as provided for the contract.

Accompanying this bid is a bid bond secured by a corporate surety, or certified check payable to the order of the Department of Transportation, for five percent of the total bid price, which deposit is to be forfeited as liquidated damages in case this bid is accepted and the Bidder shall fail to provide the required payment and performance bonds with the Department of Transportation, under the condition of this proposal, within 14 calendar days after the written notice of award is received by him, as provided in the *Standard Specifications*; otherwise said deposit will be returned to the Bidder.



*State Contract Officer*

DocuSigned by:

*Ronald E. Davenport, Jr.*

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5/23/2018

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**PROJECT SPECIAL PROVISIONS****GENERAL****CONTRACT TIME AND LIQUIDATED DAMAGES:**

(4-17-12)

108

SP1 G07 C

The date of availability for this contract is **July 9, 2018**.

The completion date for this contract is **April 27, 2022**.

Except where otherwise provided by the contract, observation periods required by the contract will not be a part of the work to be completed by the completion date and/or intermediate contract times stated in the contract. The acceptable completion of the observation periods that extend beyond the final completion date shall be a part of the work covered by the performance and payment bonds.

The liquidated damages for this contract are **Two Hundred Dollars (\$ 200.00)** per calendar day. These liquidated damages will not be cumulative with any liquidated damages which may become chargeable under Intermediate Contract Time Number 1.

**INTERMEDIATE CONTRACT TIME NUMBER 1 AND LIQUIDATED DAMAGES:**

(7-1-95) (Rev. 2-21-12)

108

SP1 G13 A

Except for that work required under the Project Special Provisions entitled *Planting, Reforestation* and/or *Permanent Vegetation Establishment*, included elsewhere in this proposal, the Contractor will be required to complete all work included in this contract and shall place and maintain traffic on same.

The date of availability for this intermediate contract time is **July 9, 2018**.

The completion date for this intermediate contract time is **October 29, 2021**.

The liquidated damages for this intermediate contract time are **Three Thousand Dollars (\$ 3,000.00)** per calendar day.

Upon apparent completion of all the work required to be completed by this intermediate date, a final inspection will be held in accordance with Article 105-17 and upon acceptance, the Department will assume responsibility for the maintenance of all work except *Planting, Reforestation* and/or *Permanent Vegetation Establishment*. The Contractor will be responsible for and shall make corrections of all damages to the completed roadway caused by his planting operations, whether occurring prior to or after placing traffic through the project.

**INTERMEDIATE CONTRACT TIME NUMBER 2 AND LIQUIDATED DAMAGES:**

(2-20-07)

108

SP1 G14 B

The Contractor shall not narrow or close a lane of traffic on **6th Street, 5th Street, Trade Street, and/or 4th Street**, detain and /or alter the traffic flow on or during holiday weekends, special events, or any other time when traffic is unusually heavy, including the following schedules:

**HOLIDAY AND HOLIDAY WEEKEND LANE CLOSURE RESTRICTIONS**

1. For **unexpected occurrence** that creates unusually high traffic volumes, as directed by the Engineer.
2. For **New Year's Day**, between the hours of **7:00 a.m.** December 31<sup>st</sup> and **6:00 p.m.** January 2<sup>nd</sup>. If New Year's Day is on a Friday, Saturday, Sunday or Monday, then until **6:00 p.m.** the following Tuesday.
3. For **Easter**, between the hours of **7:00 a.m.** Thursday and **6:00 p.m.** Monday.
4. For **Memorial Day**, between the hours of **7:00 a.m.** Friday and **6:00 p.m.** Tuesday.
5. For **Independence Day**, between the hours of **7:00 a.m.** the day before Independence Day and **6:00 p.m.** the day after Independence Day.  
  
If **Independence Day** is on a Friday, Saturday, Sunday or Monday, then between the hours of **7:00 a.m.** the Thursday before Independence Day and **6:00 p.m.** the Tuesday after Independence Day.
6. For **Labor Day**, between the hours of **7:00 a.m.** Friday and **6:00 p.m.** Tuesday.
7. For **Thanksgiving**, between the hours of **7:00 a.m.** Tuesday and **6:00 p.m.** Monday.
8. For **Christmas**, between the hours of **7:00 a.m.** the Friday before the week of Christmas Day and **6:00 p.m.** the following Tuesday after the week of Christmas Day.

Holidays and holiday weekends shall include New Year's, Easter, Memorial Day, Independence Day, Labor Day, Thanksgiving, and Christmas. The Contractor shall schedule his work so that lane closures are not required during these periods, unless otherwise directed by the Engineer.

The time of availability for this intermediate contract work shall be the time the Contractor begins to install all traffic control devices for lane closures according to the time restrictions listed herein.

The completion time for this intermediate contract work shall be the time the Contractor is required to complete the removal of all traffic control devices for lane closures according to the time restrictions stated herein and place traffic in the existing traffic pattern.

The liquidated damages are **One Thousand Dollars (\$ 1,000.00)** per hour.

**INTERMEDIATE CONTRACT TIME NUMBER 3 AND LIQUIDATED DAMAGES:**

(6-18-13)

108

SP1 G14 L

The Contractor shall complete the work required of **the sub-ballast layer and finished roadbed ready for NSR acceptance for track construction from -S1- Sta. 18+00 to -S1- Sta. 35+77** and shall place and maintain traffic on same.

The date of availability for this intermediate contract time is **July 9, 2018**.

The completion date for this intermediate contract time is **September 24, 2021**.

The liquidated damages are **One Thousand Five Hundred Dollars (\$ 1,500.00)** per calendar day.

**INTERMEDIATE CONTRACT TIME NUMBER 4 AND LIQUIDATED DAMAGES:**

(6-18-13)

108

SP1 G14 L

The Contractor shall complete the work (**excluding rub rails**) required from **-S1- Sta. 19+68 to -S1- Sta. 30+86 constructing the high-level platform including, but not limited to, on-grade structure, bridge superstructures over Trade St and 4<sup>th</sup> St and plumbing system**, and shall place and maintain traffic on same.

The date of availability for this intermediate contract time is **July 9, 2018**.

The completion date for this intermediate contract time is **September 10, 2021**.

The liquidated damages are **One Thousand Five Hundred Dollars (\$ 1,500.00)** per calendar day.

**INTERMEDIATE CONTRACT TIME NUMBER 5 AND LIQUIDATED DAMAGES:**

(6-18-13)

108

SP1 G14 L

The Contractor shall complete the work required from **-S1- Sta. 18+00 to -S1- Sta. 22+97 including, but not limited to, construction of the 5<sup>th</sup> Street Bridges, roadbed up to subgrade level, Abutment 1 and Pier 1 of the Trade Street bridges, grading and drainage, retaining walls, canopy foundations (Piers 1 and 2) and egress stairs** and shall place and maintain traffic on same. **The sub-ballast layer, platform, associated plumbing system, superstructure of the Trade Street bridges and final paving are excluded.**

The date of availability for this intermediate contract time is **July 9, 2018**.

The completion date for this intermediate contract time is **April 1, 2021**.

The liquidated damages are **One Thousand Dollars (\$ 1,000.00)** per calendar day.

**INTERMEDIATE CONTRACT TIME NUMBER 6 AND LIQUIDATED DAMAGES:**

(6-18-13)

108

SP1 G14 L

The Contractor shall complete the work required from **-S1- Sta. 22+61 to -S1- Sta. 28+76 including, but not limited to, construction of the Trade Street Bridges, roadbed up to subgrade level and 4<sup>th</sup> Street bridges, grading and drainage, retaining walls, canopy foundations (Piers 3 and 4), concourse, baggage ramp and pedestrian/baggage tunnels** and shall place and maintain traffic on same. **The sub-ballast layer, platform, plumbing system,**

**concourse and tunnel fit out, and final paving are excluded.**

The date of availability for this intermediate contract time is **the day the Engineer informs the Contractor that Parcel 022A is available for his construction.**

The completion date for this intermediate contract time is **October 31, 2020.**

The liquidated damages are **One Thousand Dollars (\$ 1,000.00)** per calendar day.

**INTERMEDIATE CONTRACT TIME NUMBER 7 AND LIQUIDATED DAMAGES:**

(6-18-13)

108

SP1 G14 L

The Contractor shall complete the work required **from -S1- Sta. 28+48 to -S1- Sta. 35+77 including, but not limited to, construction of Bent 2 and Abutment 2 of the 4<sup>th</sup> Street bridges, roadbed up to subgrade level, grading and drainage, retaining walls, egress stairs, tunnel and walkway** and shall place and maintain traffic on same. **The sub-ballast layer, platform, associated plumbing system and final paving, and superstructure of the 4<sup>th</sup> Street bridges are excluded.**

The date of availability for this intermediate contract time is **July 9, 2018.**

The completion date for this intermediate contract time is **August 28, 2020.**

The liquidated damages are **One Thousand Dollars (\$ 1,000.00)** per calendar day.

**INTERMEDIATE CONTRACT TIME NUMBER 8 AND LIQUIDATED DAMAGES:**

(6-18-13)

108

SP1 G14 L

The Contractor shall complete the work required **from -S1- Sta. 41+81 to -S1- Sta. 49+17 including, but not limited to, construction of the P&N bridge and finished roadbed, grading and drainage, rock plating and sub-ballast** and shall place and maintain traffic on same.

**The Contractor's attention is directed to access restrictions within this station range detailed elsewhere in this Contract.**

The date of availability for this intermediate contract time is **July 9, 2018.**

The completion date for this intermediate contract time is **June 25, 2021.**

The liquidated damages are **One Thousand Five Hundred Dollars (\$ 1,500.00)** per calendar day.

**INTERMEDIATE CONTRACT TIME NUMBER 9 AND LIQUIDATED DAMAGES:**

(6-18-13)

108

SP1 G14 L

The Contractor shall complete the work required of **the substructure of Structure 8 (P&N bridge), retaining wall RW-9 and all utility work between -S1- Sta. 41+81 and -S1- Sta. 43+37. This includes, all grading, drainage, bridge demolition, temporary pedestrian walkway enclosure, and temporary shoring required to complete this work** and shall place and maintain traffic on same. **The P&N bridge superstructure is excluded.**

**The Contractor's attention is directed to access restrictions within this station range detailed elsewhere in this Contract.**

The date of availability for this intermediate contract time is **July 9, 2018**.

The completion date for this intermediate contract time is **July 10, 2020**.

The liquidated damages are **One Thousand Dollars (\$ 1,000.00)** per calendar day.

**INTERMEDIATE CONTRACT TIME NUMBER 10 AND LIQUIDATED DAMAGES:**

(6-18-13)

108

SPI G14 L

The Contractor shall complete the work required from **-S1- Sta. 10+00 to -S1- Sta. 18+00 and from -S1- Sta. 35+77 to -S1- Sta. 42+00**. This includes, but is not limited to, the **6<sup>th</sup> Street bridge, grading, drainage, retaining walls, rock plating, utility relocations, and sub-ballast** and shall place and maintain traffic on same. **Grading and structure construction for -A1- from -S1- Sta. 40+50 to -A1- Sta. 49+50 is excluded from this ICT.**

**The Contractor's attention is directed to access restrictions within this station range detailed elsewhere in this Contract.**

The date of availability for this intermediate contract time is **July 9, 2018**.

The completion date for this intermediate contract time is **August 28, 2020**.

The liquidated damages are **One Thousand Dollars (\$ 1,000.00)** per calendar day.

**INTERMEDIATE CONTRACT TIME NUMBER 11 AND LIQUIDATED DAMAGES:**

(2-20-07) (Rev. 6-18-13)

108

SPI G14 F

The Contractor shall complete the work required of **6<sup>th</sup> Street, Phase I, Step #1** as shown on Sheet **TMP-2A** and shall place and maintain traffic on same.

The time of availability for this intermediate contract time is the **Friday at 8:00 p.m.** that the Contractor elects to begin the work.

The completion time for this intermediate contract time is the following **Monday at 5:00 a.m.** after the time of availability.

The liquidated damages are **One Thousand Dollars (\$ 1,000.00)** per hour.

**INTERMEDIATE CONTRACT TIME NUMBER 12 AND LIQUIDATED DAMAGES:**

(2-20-07) (Rev. 6-18-13)

108

SPI G14 F

The Contractor shall complete the work required of **6<sup>th</sup> Street, Phase II, Step #1** as shown on Sheet **TMP-2A** and shall place and maintain traffic on same.

The time of availability for this intermediate contract time is the **Friday at 8:00 p.m.** that the Contractor elects to begin the work.

The completion time for this intermediate contract time is the following **Monday at 5:00 a.m.** after the time of availability.

The liquidated damages are **One Thousand Dollars (\$ 1,000.00)** per hour.

**INTERMEDIATE CONTRACT TIME NUMBER 13 AND LIQUIDATED DAMAGES:**

(2-20-07) (Rev. 6-18-13)

108

SPI G14 F

The Contractor shall complete the work required of **5<sup>th</sup> Street, Phase III, Step #1** as shown on Sheets **TMP-2C or TMP-2D** and shall place and maintain traffic on same.

The time of availability for this intermediate contract time is the **Friday at 8:00 p.m.** that the Contractor elects to begin the work.

The completion time for this intermediate contract time is the following **Monday at 5:00 a.m.** after the time of availability.

The liquidated damages are **One Thousand Dollars (\$ 1,000.00)** per hour.

**INTERMEDIATE CONTRACT TIME NUMBER 14 AND LIQUIDATED DAMAGES:**

(2-20-07) (Rev. 6-18-13)

108

SPI G14 F

The Contractor shall complete the work required of **Trade Street, Phase II, Step #1** as shown on Sheet **TMP-2E** and shall place and maintain traffic on same.

The time of availability for this intermediate contract time is the **Friday at 8:00 p.m.** that the Contractor elects to begin the work.

The completion time for this intermediate contract time is the following **Monday at 5:00 a.m.** after the time of availability.

The liquidated damages are **One Thousand Dollars (\$ 1,000.00)** per hour.

**INTERMEDIATE CONTRACT TIME NUMBER 15 AND LIQUIDATED DAMAGES:**

(2-20-07) (Rev. 6-18-13)

108

SPI G14 F

The Contractor shall complete the work required of **4<sup>th</sup> Street, Phase I, Step #2** as shown on Sheet **TMP-2F** and shall place and maintain traffic on same.

The time of availability for this intermediate contract time is the **Friday at 8:00 p.m.** that the Contractor elects to begin the work.

The completion time for this intermediate contract time is the following **Monday at 5:00 a.m.** after the time of availability.

The liquidated damages are **One Thousand Dollars (\$ 1,000.00)** per hour.

**INTERMEDIATE CONTRACT TIME NUMBER 16 AND LIQUIDATED DAMAGES:**

(2-20-07) (Rev. 6-18-13)

108

SP1 G14 F

The Contractor shall complete the work required of **4<sup>th</sup> Street, Phase III, Step #1** as shown on Sheet **TMP-2E** and shall place and maintain traffic on same.

The time of availability for this intermediate contract time is the **Friday at 8:00 p.m.** that the Contractor elects to begin the work.

The completion time for this intermediate contract time is the following **Monday at 5:00 a.m.** after the time of availability.

The liquidated damages are **One Thousand Dollars (\$ 1,000.00)** per hour.

**INTERMEDIATE CONTRACT TIME NUMBER 17 AND LIQUIDATED DAMAGES:**

(2-20-07) (Rev. 6-18-13)

108

SP1 G14 H

The Contractor shall complete the work required of **Pedestrian Walkway, Phase I, Step #2** as shown on Sheet **TMP-11** and shall place and maintain traffic on same.

**The Contractor's attention is directed to access restrictions within this station range detailed elsewhere in this Contract.**

The date of availability for this intermediate contract time is the date the Contractor elects to begin the work.

The completion date for this intermediate contract time is **fourteen (14)** calendar days from when the Contractor begins work.

The liquidated damages are **Five Hundred Dollars (\$ 500.00)** per calendar day.

**INTERMEDIATE CONTRACT TIME NUMBER 18 AND LIQUIDATED DAMAGES:**

(2-20-07) (Rev. 6-18-13)

108

SP1 G14 G

The Contractor shall complete the work required of **Pedestrian Walkway, Phase I, Step #3** as shown on Sheet **TMP-11** and shall place and maintain traffic on same.

**The Contractor's attention is directed to access restrictions within this station range detailed elsewhere in this Contract.**

The time of availability for this intermediate contract time is the **Friday at 8:00 p.m.** that the Contractor elects to begin the work.

The completion time for this intermediate contract time is the following **Monday at 5:00 a.m.** after the time of availability.

The liquidated damages are **One Thousand Dollars (\$ 1,000.00)** per hour.

**INTERMEDIATE CONTRACT TIME NUMBER 19 AND LIQUIDATED DAMAGES:**

(2-20-07) (Rev. 6-18-13)

108

SP1 G14 F

The Contractor shall complete the work **requiring the CATS Gold Line overhead contact system (OCS) to be shut down according to the approved Site Specific Safety Plan (SSSP).**

The time of availability for this intermediate contract time is **1:00 a.m.** on the day the Contractor elects to begin the work.

The completion time for this intermediate contract time is **4:00 a.m.** on the **same** day after the time of availability.

The liquidated damages are **Five Hundred Dollars (\$ 500.00)** per hour.

**PERMANENT VEGETATION ESTABLISHMENT:**

(2-16-12) (Rev. 10-15-13)

104

SP1 G16

Establish a permanent stand of the vegetation mixture shown in the contract. During the period between initial vegetation planting and final project acceptance, perform all work necessary to establish permanent vegetation on all erodible areas within the project limits, as well as, in borrow and waste pits. This work shall include erosion control device maintenance and installation, repair seeding and mulching, supplemental seeding and mulching, mowing, and fertilizer topdressing, as directed. All work shall be performed in accordance with the applicable section of the *2018 Standard Specifications*. All work required for initial vegetation planting shall be performed as a part of the work necessary for the completion and acceptance of the Intermediate Contract Time (ICT). Between the time of ICT and Final Project acceptance, or otherwise referred to as the vegetation establishment period, the Department will be responsible for preparing the required National Pollutant Discharge Elimination System (NPDES) inspection records.

Once the Engineer has determined that the permanent vegetation establishment requirement has been achieved at an 80% vegetation density (the amount of established vegetation per given area to stabilize the soil) and no erodible areas exist within the project limits, the Contractor will be notified to remove the remaining erosion control devices that are no longer needed. The Contractor will be responsible for, and shall correct any areas disturbed by operations performed in permanent vegetation establishment and the removal of temporary erosion control measures, whether occurring prior to or after placing traffic on the project.

Payment for *Response for Erosion Control, Seeding and Mulching, Repair Seeding, Supplemental Seeding, Mowing, Fertilizer Topdressing, Silt Excavation, and Stone for Erosion Control* will be made at contract unit prices for the affected items. Work required that is not represented by contract line items will be paid in accordance with Articles 104-7 or 104-3 of the *2018 Standard Specifications*. No additional compensation will be made for maintenance and removal of temporary erosion control items.



**MANDATORY PRE-BID CONFERENCE (Prequalifying To Bid):**

(7-18-06) (Rev. 3-25-13)

SP1 1-14

In order for all prospective bidders to have an extensive knowledge of the project, all prospective bidders shall attend a mandatory pre-bid conference on Tuesday, May 1<sup>st</sup> at 9:00am at:

NCDOT County Maintenance Yard (Paw Creek)  
6820 Rozzelles Ferry Road  
Charlotte, NC 28214  
Contact: Phillip Davies 919-707-4159

The bidders may also attend a voluntary site visit immediately following the pre-bid conference. Appropriate railroad PPE will be required for the site visit, including hardhat, safety goggles, reflective vest and safety boots.

The pre-bid conference will include a thorough discussion of the plans, contract pay items, special provisions, etc.

Only bidders who have attended and properly registered at the above scheduled pre-bid conference and who have met all other prequalification requirements will be considered prequalified to bid on this project. A bid received from a bidder who has not attended and properly registered at the above scheduled pre-bid conference will not be accepted and considered for award.

Attendance at the pre-bid conference will not meet the requirements of proper registration unless the individual attending has registered at the pre-bid conference in accordance with the following:

- (A) The individual has signed his name on the official roster no later than 30 minutes after the above noted time for the beginning of the conference.
- (B) The individual has written in the name and address of the company he or she represents.
- (C) Only one company has been shown as being represented by the individual attending.
- (D) The individual attending is an officer or permanent employee of the company they are representing.

Attendance at any prior pre-bid conference will not meet the requirement of this provision.

**DELAY IN RIGHT OF ENTRY:**

(7-1-95) (Rev. 7-15-14)

108

SP1 G22

The Contractor will not be allowed right of entry to the following parcel(s) prior to the listed date(s) unless otherwise permitted by the Engineer.

<b><u>Parcel No.</u></b>	<b><u>Property Owner</u></b>	<b><u>Date</u></b>
1	City of Charlotte (Tenant Carolina Panthers)	8-1-2018

**DELAY IN RIGHT OF WAY:**

SP1 1-24

The Contractor shall take no action that will result in unnecessary inconvenience, disproportionate injury or any action coercive in nature to occupants of residences, businesses, farms, or non-profit organizations who have not yet moved from the right of way of the parcels below:

<b><u>Parcel No.</u></b>	<b><u>Property Owner</u></b>	<b><u>Estimated Vacating Date</u></b>
22A	Greyhound Lines, Inc.	11-1-2018

Extension of contract time may be granted in accordance with Article 108-10(B)3 for delays caused by interferences beyond such estimated vacating date.

**MAJOR CONTRACT ITEMS:**

(2-19-02)

104

SP1 G28

The following listed items are the major contract items for this contract (see Article 104-5 of the 2018 Standard Specifications):

<b>Line #</b>	<b>Description</b>
16	Select Granular Material, Class III
192	Class AA Concrete
215	Class AA Concrete (Bridge)
216	Reinforcing Steel (Bridge)

**SPECIALTY ITEMS:**

(7-1-95)(Rev. 1-17-12)

108-6

SP1 G37

Items listed below will be the specialty items for this contract (see Article 108-6 of the 2018 Standard Specifications).

<b>Line #</b>	<b>Description</b>
68-72	Guardrail
73-83, 281, 283	Fencing
89-94, 112-113	Signing
108, 110	Long-Life Pavement Markings
114-142	Utility Construction
143-168	Erosion Control
184-185, 282, 286	Micropiles
204-212	Drilled Piers

**FUEL PRICE ADJUSTMENT:**

(11-15-05) (Rev. 2-18-14)

109-8

SP1 G43

Revise the 2018 Standard Specifications as follows:

**Page 1-83, Article 109-8, Fuel Price Adjustments**, add the following:

The base index price for DIESEL #2 FUEL is \$ **2.0984** per gallon. Where any of the following are included as pay items in the contract, they will be eligible for fuel price adjustment.

The pay items and the fuel factor used in calculating adjustments to be made will be as follows:

<b>Description</b>	<b>Units</b>	<b>Fuel Usage Factor Diesel</b>
Unclassified Excavation	Gal/CY	0.29
Borrow Excavation	Gal/CY	0.29
Class IV Subgrade Stabilization	Gal/Ton	0.55
Aggregate Base Course	Gal/Ton	0.55
Sub-Ballast	Gal/Ton	0.55
Asphalt Concrete Base Course, Type _____	Gal/Ton	2.90
Asphalt Concrete Intermediate Course, Type _____	Gal/Ton	2.90
Asphalt Concrete Surface Course, Type _____	Gal/Ton	2.90
Open-Graded Asphalt Friction Course	Gal/Ton	2.90
Permeable Asphalt Drainage Course, Type _____	Gal/Ton	2.90
Sand Asphalt Surface Course, Type _____	Gal/Ton	2.90
Aggregate for Cement Treated Base Course	Gal/Ton	0.55
Portland Cement for Cement Treated Base Course	Gal/Ton	0.55
__" Portland Cement Concrete Pavement	Gal/SY	0.245
Concrete Shoulders Adjacent to __" Pavement	Gal/SY	0.245

**PAYOUT SCHEDULE:**

(1-19-10) (Rev. 1-17-12)

108

SP1 G57

Submit an Anticipated Monthly Payout Schedule prior to beginning construction. The Anticipated Monthly Payout Schedule will be used by the Department to monitor funding levels for this project. Include a monthly percentage breakdown (in terms of the total contract amount) of the work anticipated to be completed. The schedule should begin with the date the Contractor plans to begin construction and end with the anticipated completion date. Submit updates of the Anticipated Monthly Payout Schedule on March 15, June 15, September 15, and December 15 of each calendar year until project acceptance. Submit the original Anticipated Monthly Payout Schedule and all subsequent updates to the Resident Engineer with a copy to the State Construction Engineer at 1 South Wilmington Street, 1543 Mail Service Center, Raleigh, NC 27699-1543.

**SCHEDULE OF ESTIMATED COMPLETION PROGRESS:**

(7-15-08) (Rev. 5-16-17)

108-2

SP1 G58

The Contractor's attention is directed to the Standard Special Provision entitled *Availability of Funds Termination of Contracts* included elsewhere in this proposal. The Department of Transportation's schedule of estimated completion progress for this project as required by that Standard Special Provision is as follows:

<b><u>Fiscal Year</u></b>		<b><u>Progress (% of Dollar Value)</u></b>
2019	(7/01/18 - 6/30/19)	<b>42%</b> of Total Amount Bid
2020	(7/01/19 - 6/30/20)	<b>32%</b> of Total Amount Bid
2021	(7/01/20 - 6/30/21)	<b>21%</b> of Total Amount Bid
2022	(7/01/21 - 6/30/22)	<b>5%</b> of Total Amount Bid

The Contractor shall also furnish his own progress schedule in accordance with Article 108-2 of the *2018 Standard Specifications*. Any acceleration of the progress as shown by the Contractor's

progress schedule over the progress as shown above shall be subject to the approval of the Engineer.

**DISADVANTAGED BUSINESS ENTERPRISE:**

(10-16-07)(Rev. 1-17-17)

102-15(J)

SP1 G61

**Description**

The purpose of this Special Provision is to carry out the U.S. Department of Transportation's policy of ensuring nondiscrimination in the award and administration of contracts financed in whole or in part with Federal funds. This provision is guided by 49 CFR Part 26.

**Definitions**

*Additional DBE Subcontractors* - Any DBE submitted at the time of bid that will not be used to meet the DBE goal. No submittal of a Letter of Intent is required.

*Committed DBE Subcontractor* - Any DBE submitted at the time of bid that is being used to meet the DBE goal by submission of a Letter of Intent. Or any DBE used as a replacement for a previously committed DBE firm.

*Contract Goal Requirement* - The approved DBE participation at time of award, but not greater than the advertised contract goal.

*DBE Goal* - A portion of the total contract, expressed as a percentage that is to be performed by committed DBE subcontractor.

*Disadvantaged Business Enterprise (DBE)* - A firm certified as a Disadvantaged Business Enterprise through the North Carolina Unified Certification Program.

*Goal Confirmation Letter* - Written documentation from the Department to the bidder confirming the Contractor's approved, committed DBE participation along with a listing of the committed DBE firms.

*Manufacturer* - A firm that operates or maintains a factory or establishment that produces on the premises, the materials or supplies obtained by the Contractor.

*Regular Dealer* - A firm that owns, operates, or maintains a store, warehouse, or other establishment in which the materials or supplies required for the performance of the contract are bought, kept in stock, and regularly sold to the public in the usual course of business. A regular dealer engages in, as its principal business and in its own name, the purchase and sale or lease of the products in question. A regular dealer in such bulk items as steel, cement, gravel, stone, and petroleum products need not keep such products in stock, if it owns and operates distribution equipment for the products. Brokers and packagers are not regarded as manufacturers or regular dealers within the meaning of this section.

*North Carolina Unified Certification Program (NCUCP)* - A program that provides comprehensive services and information to applicants for DBE certification, such that an applicant is required to apply only once for a DBE certification that will be honored by all recipients of

USDOT funds in the state and not limited to the Department of Transportation only. The Certification Program is in accordance with 49 CFR Part 26.

*United States Department of Transportation (USDOT)* - Federal agency responsible for issuing regulations (49 CFR Part 26) and official guidance for the DBE program.

### **Forms and Websites Referenced in this Provision**

*DBE Payment Tracking System* - On-line system in which the Contractor enters the payments made to DBE subcontractors who have performed work on the project.  
<https://apps.dot.state.nc.us/Vendor/PaymentTracking/>

*DBE-IS Subcontractor Payment Information* - Form for reporting the payments made to all DBE firms working on the project. This form is for paper bid projects only.  
<https://connect.ncdot.gov/business/Turnpike/Documents/Form%20DBE-IS%20Subcontractor%20Payment%20Information.pdf>

*RF-1 DBE Replacement Request Form* - Form for replacing a committed DBE.  
<http://connect.ncdot.gov/projects/construction/Construction%20Forms/DBE%20MBE%20WBE%20Replacement%20Request%20Form.pdf>

*SAF Subcontract Approval Form* - Form required for approval to sublet the contract.  
<http://connect.ncdot.gov/projects/construction/Construction%20Forms/Subcontract%20Approval%20Form%20Rev.%202012.zip>

*JC-1 Joint Check Notification Form* - Form and procedures for joint check notification. The form acts as a written joint check agreement among the parties providing full and prompt disclosure of the expected use of joint checks.  
<http://connect.ncdot.gov/projects/construction/Construction%20Forms/Joint%20Check%20Notification%20Form.pdf>

*Letter of Intent* - Form signed by the Contractor and the DBE subcontractor, manufacturer or regular dealer that affirms that a portion of said contract is going to be performed by the signed DBE for the amount listed at the time of bid.  
<http://connect.ncdot.gov/letting/LetCentral/Letter%20of%20Intent%20to%20Perform%20as%20a%20Subcontractor.pdf>

*Listing of DBE Subcontractors Form* - Form for entering DBE subcontractors on a project that will meet this DBE goal. This form is for paper bids only.  
[http://connect.ncdot.gov/municipalities/Bid%20Proposals%20for%20LGA%20Content/08%20DBE%20Subcontractors%20\(Federal\).docx](http://connect.ncdot.gov/municipalities/Bid%20Proposals%20for%20LGA%20Content/08%20DBE%20Subcontractors%20(Federal).docx)

*Subcontractor Quote Comparison Sheet* - Spreadsheet for showing all subcontractor quotes in the work areas where DBEs quoted on the project. This sheet is submitted with good faith effort packages.  
<http://connect.ncdot.gov/business/SmallBusiness/Documents/DBE%20Subcontractor%20Quote%20Comparison%20Example.xls>

**DBE Goal**

The following DBE goal for participation by Disadvantaged Business Enterprises is established for this contract:

Disadvantaged Business Enterprises **2.0** %

- (A) *If the DBE goal is more than zero*, the Contractor shall exercise all necessary and reasonable steps to ensure that DBEs participate in at least the percent of the contract as set forth above as the DBE goal.
- (B) *If the DBE goal is zero*, the Contractor shall make an effort to recruit and use DBEs during the performance of the contract. Any DBE participation obtained shall be reported to the Department.

**Directory of Transportation Firms (Directory)**

Real-time information is available about firms doing business with the Department and firms that are certified through NCUCP in the Directory of Transportation Firms. Only firms identified in the Directory as DBE certified shall be used to meet the DBE goal. The Directory can be found at the following link. [https:// www.ebs.nc.gov/VendorDirectory/default.html](https://www.ebs.nc.gov/VendorDirectory/default.html)

The listing of an individual firm in the directory shall not be construed as an endorsement of the firm's capability to perform certain work.

**Listing of DBE Subcontractors**

At the time of bid, bidders shall submit all DBE participation that they anticipate to use during the life of the contract. Only those identified to meet the DBE goal will be considered committed, even though the listing shall include both committed DBE subcontractors and additional DBE subcontractors. Additional DBE subcontractor participation submitted at the time of bid will be used toward the Department's overall race-neutral goal. Only those firms with current DBE certification at the time of bid opening will be acceptable for listing in the bidder's submittal of DBE participation. The Contractor shall indicate the following required information:

- (A) Electronic Bids

Bidders shall submit a listing of DBE participation in the appropriate section of Expedite, the bidding software of Bid Express®.

- (1) Submit the names and addresses of DBE firms identified to participate in the contract. If the bidder uses the updated listing of DBE firms shown in Expedite, the bidder may use the dropdown menu to access the name and address of the DBE firm.
- (2) Submit the contract line numbers of work to be performed by each DBE firm. When no figures or firms are entered, the bidder will be considered to have no DBE participation.

- (3) The bidder shall be responsible for ensuring that the DBE is certified at the time of bid by checking the Directory of Transportation Firms. If the firm is not certified at the time of the bid-letting, that DBE's participation will not count towards achieving the DBE goal.
- (B) Paper Bids
- (1) *If the DBE goal is more than zero,*
    - (a) Bidders, at the time the bid proposal is submitted, shall submit a listing of *DBE* participation, including the names and addresses on *Listing of DBE Subcontractors* contained elsewhere in the contract documents in order for the bid to be considered responsive. Bidders shall indicate the total dollar value of the DBE participation for the contract.
    - (b) If bidders have no DBE participation, they shall indicate this on the *Listing of DBE Subcontractors* by entering the word "None" or the number "0." This form shall be completed in its entirety. **Blank forms will not be deemed to represent zero participation.** Bids submitted that do not have DBE participation indicated on the appropriate form will not be read publicly during the opening of bids. The Department will not consider these bids for award and the proposal will be rejected.
    - (c) The bidder shall be responsible for ensuring that the DBE is certified at the time of bid by checking the Directory of Transportation Firms. If the firm is not certified at the time of the bid-letting, that DBE's participation will not count towards achieving the corresponding goal.
  - (2) *If the DBE goal is zero,* entries on the *Listing of DBE Subcontractors* are not required for the zero goal, however any DBE participation that is achieved during the project shall be reported in accordance with requirements contained elsewhere in the special provision.

### **DBE Prime Contractor**

When a certified DBE firm bids on a contract that contains a DBE goal, the DBE firm is responsible for meeting the goal or making good faith efforts to meet the goal, just like any other bidder. In most cases, a DBE bidder on a contract will meet the DBE goal by virtue of the work it performs on the contract with its own forces. However, all the work that is performed by the DBE bidder and any other DBE subcontractors will count toward the DBE goal. The DBE bidder shall list itself along with any DBE subcontractors, if any, in order to receive credit toward the DBE goal.

For example, if the DBE goal is 45% and the DBE bidder will only perform 40% of the contract work, the prime will list itself at 40%, and the additional 5% shall be obtained through additional DBE participation with DBE subcontractors or documented through a good faith effort.

DBE prime contractors shall also follow Sections A and B listed under *Listing of DBE Subcontractor* just as a non-DBE bidder would.

### **Written Documentation – Letter of Intent**

The bidder shall submit written documentation for each DBE that will be used to meet the DBE goal of the contract, indicating the bidder's commitment to use the DBE in the contract. This documentation shall be submitted on the Department's form titled *Letter of Intent*.

The documentation shall be received in the office of the State Contractor Utilization Engineer or at DBE@ncdot.gov no later than 10:00 a.m. of the sixth calendar day following opening of bids, unless the sixth day falls on an official state holiday. In that situation, it is due in the office of the State Contractor Utilization Engineer no later than 10:00 a.m. on the next official state business day.

If the bidder fails to submit the Letter of Intent from each committed DBE to be used toward the DBE goal, or if the form is incomplete (i.e. both signatures are not present), the DBE participation will not count toward meeting the DBE goal. If the lack of this participation drops the commitment below the DBE goal, the Contractor shall submit evidence of good faith efforts, completed in its entirety, to the State Contractor Utilization Engineer or DBE@ncdot.gov no later than 10:00 a.m. on the eighth calendar day following opening of bids, unless the eighth day falls on an official state holiday. In that situation, it is due in the office of the State Contractor Utilization Engineer no later than 10:00 a.m. on the next official state business day.

### **Submission of Good Faith Effort**

If the bidder fails to meet or exceed the DBE goal, the apparent lowest responsive bidder shall submit to the Department documentation of adequate good faith efforts made to reach the DBE goal.

A hard copy and an electronic copy of this information shall be received in the office of the State Contractor Utilization Engineer or at DBE@ncdot.gov no later than 10:00 a.m. on the sixth calendar day following opening of bids unless the sixth day falls on an official state holiday. In that situation, it is due in the office of the State Contractor Utilization Engineer no later than 10:00 a.m. on the next official state business day. If the contractor cannot send the information electronically, then one complete set and 5 copies of this information shall be received under the same time constraints above.

Note: Where the information submitted includes repetitious solicitation letters, it will be acceptable to submit a representative letter along with a distribution list of the firms that were solicited. Documentation of DBE quotations shall be a part of the good faith effort submittal. This documentation may include written subcontractor quotations, telephone log notations of verbal quotations, or other types of quotation documentation.

### **Consideration of Good Faith Effort for Projects with DBE Goals More Than Zero**

Adequate good faith efforts mean that the bidder took all necessary and reasonable steps to achieve the goal which, by their scope, intensity, and appropriateness, could reasonably be expected to



obtain sufficient DBE participation. Adequate good faith efforts also mean that the bidder actively and aggressively sought DBE participation. Mere *pro forma* efforts are not considered good faith efforts.

The Department will consider the quality, quantity, and intensity of the different kinds of efforts a bidder has made. Listed below are examples of the types of actions a bidder will take in making a good faith effort to meet the goal and are not intended to be exclusive or exhaustive, nor is it intended to be a mandatory checklist.

- (A) Soliciting through all reasonable and available means (e.g. attendance at pre-bid meetings, advertising, written notices, use of verifiable electronic means through the use of the NCDOT Directory of Transportation Firms) the interest of all certified DBEs who have the capability to perform the work of the contract. The bidder must solicit this interest within at least 10 days prior to bid opening to allow the DBEs to respond to the solicitation. Solicitation shall provide the opportunity to DBEs within the Division and surrounding Divisions where the project is located. The bidder must determine with certainty if the DBEs are interested by taking appropriate steps to follow up initial solicitations.
- (B) Selecting portions of the work to be performed by DBEs in order to increase the likelihood that the DBE goals will be achieved.
  - (1) Where appropriate, break out contract work items into economically feasible units to facilitate DBE participation, even when the prime contractor might otherwise prefer to perform these work items with its own forces.
  - (2) Negotiate with subcontractors to assume part of the responsibility to meet the contract DBE goal when the work to be sublet includes potential for DBE participation (2<sup>nd</sup> and 3<sup>rd</sup> tier subcontractors).
- (C) Providing interested DBEs with adequate information about the plans, specifications, and requirements of the contract in a timely manner to assist them in responding to a solicitation.
- (D)
  - (1) Negotiating in good faith with interested DBEs. It is the bidder's responsibility to make a portion of the work available to DBE subcontractors and suppliers and to select those portions of the work or material needs consistent with the available DBE subcontractors and suppliers, so as to facilitate DBE participation. Evidence of such negotiation includes the names, addresses, and telephone numbers of DBEs that were considered; a description of the information provided regarding the plans and specifications for the work selected for subcontracting; and evidence as to why additional agreements could not be reached for DBEs to perform the work.
  - (2) A bidder using good business judgment would consider a number of factors in negotiating with subcontractors, including DBE subcontractors, and would take a firm's price and capabilities as well as contract goals into consideration. However, the fact that there may be some additional costs involved in finding and using DBEs is not in itself sufficient reason for a bidder's failure to meet the contract DBE goal, as long as such costs are reasonable. Also, the ability or desire

of a prime contractor to perform the work of a contract with its own organization does not relieve the bidder of the responsibility to make good faith efforts. Bidding contractors are not, however, required to accept higher quotes from DBEs if the price difference is excessive or unreasonable.

- (E) Not rejecting DBEs as being unqualified without sound reasons based on a thorough investigation of their capabilities. The bidder's standing within its industry, membership in specific groups, organizations, or associates and political or social affiliations (for example, union vs. non-union employee status) are not legitimate causes for the rejection or non-solicitation of bids in the bidder's efforts to meet the project goal.
- (F) Making efforts to assist interested DBEs in obtaining bonding, lines of credit, or insurance as required by the recipient or bidder.
- (G) Making efforts to assist interested DBEs in obtaining necessary equipment, supplies, materials, or related assistance or services.
- (H) Effectively using the services of available minority/women community organizations; minority/women contractors' groups; Federal, State, and local minority/women business assistance offices; and other organizations as allowed on a case-by-case basis to provide assistance in the recruitment and placement of DBEs. Contact within 7 days from the bid opening the Business Opportunity and Work Force Development Unit at BOWD@ncdot.gov to give notification of the bidder's inability to get DBE quotes.
- (I) Any other evidence that the bidder submits which shows that the bidder has made reasonable good faith efforts to meet the DBE goal.

In addition, the Department may take into account the following:

- (1) Whether the bidder's documentation reflects a clear and realistic plan for achieving the DBE goal.
- (2) The bidders' past performance in meeting the DBE goals.
- (3) The performance of other bidders in meeting the DBE goal. For example, when the apparent successful bidder fails to meet the DBE goal, but others meet it, you may reasonably raise the question of whether, with additional reasonable efforts the apparent successful bidder could have met the goal. If the apparent successful bidder fails to meet the DBE goal, but meets or exceeds the average DBE participation obtained by other bidders, the Department may view this, in conjunction with other factors, as evidence of the apparent successful bidder having made a good faith effort.

If the Department does not award the contract to the apparent lowest responsive bidder, the Department reserves the right to award the contract to the next lowest responsive bidder that can satisfy to the Department that the DBE goal can be met or that an adequate good faith effort has been made to meet the DBE goal.

**Non-Good Faith Appeal**

The State Contractual Services Engineer will notify the contractor verbally and in writing of non-good faith. A contractor may appeal a determination of non-good faith made by the Goal Compliance Committee. If a contractor wishes to appeal the determination made by the Committee, they shall provide written notification to the State Contractual Services Engineer or at DBE@ncdot.gov. The appeal shall be made within 2 business days of notification of the determination of non-good faith.

**Counting DBE Participation Toward Meeting DBE Goal****(A) Participation**

The total dollar value of the participation by a committed DBE will be counted toward the contract goal requirement. The total dollar value of participation by a committed DBE will be based upon the value of work actually performed by the DBE and the actual payments to DBE firms by the Contractor.

**(B) Joint Checks**

Prior notification of joint check use shall be required when counting DBE participation for services or purchases that involves the use of a joint check. Notification shall be through submission of Form JC-1 (*Joint Check Notification Form*) and the use of joint checks shall be in accordance with the Department's Joint Check Procedures.

**(C) Subcontracts (Non-Trucking)**

A DBE may enter into subcontracts. Work that a DBE subcontracts to another DBE firm may be counted toward the contract goal requirement. Work that a DBE subcontracts to a non-DBE firm does not count toward the contract goal requirement. If a DBE contractor or subcontractor subcontracts a significantly greater portion of the work of the contract than would be expected on the basis of standard industry practices, it shall be presumed that the DBE is not performing a commercially useful function. The DBE may present evidence to rebut this presumption to the Department. The Department's decision on the rebuttal of this presumption is subject to review by the Federal Highway Administration but is not administratively appealable to USDOT.

**(D) Joint Venture**

When a DBE performs as a participant in a joint venture, the Contractor may count toward its contract goal requirement a portion of the total value of participation with the DBE in the joint venture, that portion of the total dollar value being a distinct clearly defined portion of work that the DBE performs with its forces.

**(E) Suppliers**

A contractor may count toward its DBE requirement 60 percent of its expenditures for materials and supplies required to complete the contract and obtained from a DBE regular dealer and 100 percent of such expenditures from a DBE manufacturer.

(F) Manufacturers and Regular Dealers

A contractor may count toward its DBE requirement the following expenditures to DBE firms that are not manufacturers or regular dealers:

- (1) The fees or commissions charged by a DBE firm for providing a *bona fide* service, such as professional, technical, consultant, or managerial services, or for providing bonds or insurance specifically required for the performance of a DOT-assisted contract, provided the fees or commissions are determined to be reasonable and not excessive as compared with fees and commissions customarily allowed for similar services.
- (2) With respect to materials or supplies purchased from a DBE, which is neither a manufacturer nor a regular dealer, count the entire amount of fees or commissions charged for assistance in the procurement of the materials and supplies, or fees or transportation charges for the delivery of materials or supplies required on a job site (but not the cost of the materials and supplies themselves), provided the fees are determined to be reasonable and not excessive as compared with fees customarily allowed for similar services.

**Commercially Useful Function**

(A) DBE Utilization

The Contractor may count toward its contract goal requirement only expenditures to DBEs that perform a commercially useful function in the work of a contract. A DBE performs a commercially useful function when it is responsible for execution of the work of the contract and is carrying out its responsibilities by actually performing, managing, and supervising the work involved. To perform a commercially useful function, the DBE shall also be responsible with respect to materials and supplies used on the contract, for negotiating price, determining quality and quantity, ordering the material and installing (where applicable) and paying for the material itself. To determine whether a DBE is performing a commercially useful function, the Department will evaluate the amount of work subcontracted, industry practices, whether the amount the firm is to be paid under the contract is commensurate with the work it is actually performing and the DBE credit claimed for its performance of the work, and any other relevant factors.

(B) DBE Utilization in Trucking

The following factors will be used to determine if a DBE trucking firm is performing a commercially useful function:

- (1) The DBE shall be responsible for the management and supervision of the entire trucking operation for which it is responsible on a particular contract, and there shall not be a contrived arrangement for the purpose of meeting DBE goals.
- (2) The DBE shall itself own and operate at least one fully licensed, insured, and operational truck used on the contract.

- (3) The DBE receives credit for the total value of the transportation services it provides on the contract using trucks it owns, insures, and operates using drivers it employs.
- (4) The DBE may subcontract the work to another DBE firm, including an owner-operator who is certified as a DBE. The DBE who subcontracts work to another DBE receives credit for the total value of the transportation services the subcontracted DBE provides on the contract.
- (5) The DBE may also subcontract the work to a non-DBE firm, including from an owner-operator. The DBE who subcontracts the work to a non-DBE is entitled to credit for the total value of transportation services provided by the non-DBE subcontractor not to exceed the value of transportation services provided by DBE-owned trucks on the contract. Additional participation by non-DBE subcontractors receives credit only for the fee or commission it receives as a result of the subcontract arrangement. The value of services performed under subcontract agreements between the DBE and the Contractor will not count towards the DBE contract requirement.
- (6) A DBE may lease truck(s) from an established equipment leasing business open to the general public. The lease must indicate that the DBE has exclusive use of and control over the truck. This requirement does not preclude the leased truck from working for others during the term of the lease with the consent of the DBE, so long as the lease gives the DBE absolute priority for use of the leased truck. This type of lease may count toward the DBE's credit as long as the driver is under the DBE's payroll.
- (7) Subcontracted/leased trucks shall display clearly on the dashboard the name of the DBE that they are subcontracted/leased to and their own company name if it is not identified on the truck itself. Magnetic door signs are not permitted.

### **DBE Replacement**

When a Contractor has relied on a commitment to a DBE firm (or an approved substitute DBE firm) to meet all or part of a contract goal requirement, the contractor shall not terminate the DBE for convenience. This includes, but is not limited to, instances in which the Contractor seeks to perform the work of the terminated subcontractor with another DBE subcontractor, a non-DBE subcontractor, or with the Contractor's own forces or those of an affiliate. A DBE may only be terminated after receiving the Engineer's written approval based upon a finding of good cause for the termination. The prime contractor must give the DBE firm 5 days to respond to the prime contractor's notice of termination and advise the prime contractor and the Department of the reasons, if any, why the firm objects to the proposed termination of its subcontract and why the Department should not approve the action.

All requests for replacement of a committed DBE firm shall be submitted to the Engineer for approval on Form RF-1 (*DBE Replacement Request*). If the Contractor fails to follow this procedure, the Contractor may be disqualified from further bidding for a period of up to 6 months.

The Contractor shall comply with the following for replacement of a committed DBE:

(A) Performance Related Replacement

When a committed DBE is terminated for good cause as stated above, an additional DBE that was submitted at the time of bid may be used to fulfill the DBE commitment. A good faith effort will only be required for removing a committed DBE if there were no additional DBEs submitted at the time of bid to cover the same amount of work as the DBE that was terminated.

If a replacement DBE is not found that can perform at least the same amount of work as the terminated DBE, the Contractor shall submit a good faith effort documenting the steps taken. Such documentation shall include, but not be limited to, the following:

- (1) Copies of written notification to DBEs that their interest is solicited in contracting the work defaulted by the previous DBE or in subcontracting other items of work in the contract.
- (2) Efforts to negotiate with DBEs for specific subbids including, at a minimum:
  - (a) The names, addresses, and telephone numbers of DBEs who were contacted.
  - (b) A description of the information provided to DBEs regarding the plans and specifications for portions of the work to be performed.
- (3) A list of reasons why DBE quotes were not accepted.
- (4) Efforts made to assist the DBEs contacted, if needed, in obtaining bonding or insurance required by the Contractor.

(B) Decertification Replacement

- (1) When a committed DBE is decertified by the Department after the SAF (*Subcontract Approval Form*) has been received by the Department, the Department will not require the Contractor to solicit replacement DBE participation equal to the remaining work to be performed by the decertified firm. The participation equal to the remaining work performed by the decertified firm will count toward the contract goal requirement.
- (2) When a committed DBE is decertified prior to the Department receiving the SAF (*Subcontract Approval Form*) for the named DBE firm, the Contractor shall take all necessary and reasonable steps to replace the DBE subcontractor with another DBE subcontractor to perform at least the same amount of work to meet the DBE goal requirement. If a DBE firm is not found to do the same amount of work, a good faith effort must be submitted to NCDOT (see A herein for required documentation).

**Changes in the Work**

When the Engineer makes changes that result in the reduction or elimination of work to be performed by a committed DBE, the Contractor will not be required to seek additional participation. When the Engineer makes changes that result in additional work to be performed by a DBE based upon the Contractor's commitment, the DBE shall participate in additional work to the same extent as the DBE participated in the original contract work.

When the Engineer makes changes that result in extra work, which has more than a minimal impact on the contract amount, the Contractor shall seek additional participation by DBEs unless otherwise approved by the Engineer.

When the Engineer makes changes that result in an alteration of plans or details of construction, and a portion or all of the work had been expected to be performed by a committed DBE, the Contractor shall seek participation by DBEs unless otherwise approved by the Engineer.

When the Contractor requests changes in the work that result in the reduction or elimination of work that the Contractor committed to be performed by a DBE, the Contractor shall seek additional participation by DBEs equal to the reduced DBE participation caused by the changes.

**Reports and Documentation**

A SAF (*Subcontract Approval Form*) shall be submitted for all work which is to be performed by a DBE subcontractor. The Department reserves the right to require copies of actual subcontract agreements involving DBE subcontractors.

When using transportation services to meet the contract commitment, the Contractor shall submit a proposed trucking plan in addition to the SAF. The plan shall be submitted prior to beginning construction on the project. The plan shall include the names of all trucking firms proposed for use, their certification type(s), the number of trucks owned by the firm, as well as the individual truck identification numbers, and the line item(s) being performed.

Within 30 calendar days of entering into an agreement with a DBE for materials, supplies or services, not otherwise documented by the SAF as specified above, the Contractor shall furnish the Engineer a copy of the agreement. The documentation shall also indicate the percentage (60% or 100%) of expenditures claimed for DBE credit.

**Reporting Disadvantaged Business Enterprise Participation**

The Contractor shall provide the Engineer with an accounting of payments made to all DBE firms, including material suppliers and contractors at all levels (prime, subcontractor, or second tier subcontractor). This accounting shall be furnished to the Engineer for any given month by the end of the following month. Failure to submit this information accordingly may result in the following action:

- (A) Withholding of money due in the next partial pay estimate; or

- (B) Removal of an approved contractor from the prequalified bidders' list or the removal of other entities from the approved subcontractors list.

While each contractor (prime, subcontractor, 2nd tier subcontractor) is responsible for accurate accounting of payments to DBEs, it shall be the prime contractor's responsibility to report all monthly and final payment information in the correct reporting manner.

Failure on the part of the Contractor to submit the required information in the time frame specified may result in the disqualification of that contractor and any affiliate companies from further bidding until the required information is submitted.

Failure on the part of any subcontractor to submit the required information in the time frame specified may result in the disqualification of that contractor and any affiliate companies from being approved for work on future DOT projects until the required information is submitted.

Contractors reporting transportation services provided by non-DBE lessees shall evaluate the value of services provided during the month of the reporting period only.

At any time, the Engineer can request written verification of subcontractor payments.

The Contractor shall report the accounting of payments through the Department's DBE Payment Tracking System.

### **Failure to Meet Contract Requirements**

Failure to meet contract requirements in accordance with Subarticle 102-15(J) of the *2018 Standard Specifications* may be cause to disqualify the Contractor.

### **CERTIFICATION FOR FEDERAL-AID CONTRACTS:**

(3-21-90)

SP1 G85

The prospective participant certifies, by signing and submitting this bid or proposal, to the best of his or her knowledge and belief, that:

- (A) No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.
- (B) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, *Disclosure Form to Report Lobbying*, in accordance with its instructions.



This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by *Section 1352, Title 31, U.S. Code*. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

The prospective participant also agrees by submitting his or her bid or proposal that he or she shall require that the language of this certification be included in all lower tier subcontracts, which exceed \$100,000 and that all such subrecipients shall certify and disclose accordingly.

**CONTRACTOR'S LICENSE REQUIREMENTS:**

(7-1-95)

102-14

SP1 G88

If the successful bidder does not hold the proper license to perform any plumbing, heating, air conditioning, or electrical work in this contract, he will be required to sublet such work to a contractor properly licensed in accordance with *Article 2 of Chapter 87 of the General Statutes* (licensing of heating, plumbing, and air conditioning contractors) and *Article 4 of Chapter 87 of the General Statutes* (licensing of electrical contractors).

**U.S. DEPARTMENT OF TRANSPORTATION HOTLINE:**

(11-22-94)

108-5

SP1 G100

To report bid rigging activities call: **1-800-424-9071**

The U.S. Department of Transportation (DOT) operates the above toll-free hotline Monday through Friday, 8:00 a.m. to 5:00 p.m. eastern time. Anyone with knowledge of possible bid rigging, bidder collusion, or other fraudulent activities should use the hotline to report such activities.

The hotline is part of the DOT's continuing effort to identify and investigate highway construction contract fraud and abuse is operated under the direction of the DOT Inspector General. All information will be treated confidentially and caller anonymity will be respected.

**CARGO PREFERENCE ACT:**

(2-16-16)

Privately owned United States-flag commercial vessels transporting cargoes are subject to the Cargo Preference Act (CPA) of 1954 requirements and regulations found in 46 CFR 381.7. Contractors are directed to clause (b) of 46 CFR 381.7 as follows:

- (b) Contractor and Subcontractor Clauses. "Use of United States-flag vessels: The contractor agrees-

" (1) To utilize privately owned United States-flag commercial vessels to ship at least 50 percent of the gross tonnage (computed separately for dry bulk carriers, dry cargo liners, and tankers) involved, whenever shipping any equipment, material, or commodities pursuant to this contract, to the extent such vessels are available at fair and reasonable rates for United States-flag commercial vessels.

(2) To furnish within 20 days following the date of loading for shipments originating within the United States or within 30 working days following the date of loading for shipments

originating outside the United States a legible copy of a rated, 'on-board' commercial ocean bill-of-lading in English for each shipment of cargo described in paragraph (b) (1) of this section to both the Contracting Officer (through the prime contractor in the case of subcontractor bills-of-lading) and to the Division of National Cargo, Office of Market Development, Maritime Administration, Washington, DC 20590.

(3) To insert the substance of the provisions of this clause in all subcontracts issued pursuant to this contract."

**SUBSURFACE INFORMATION:**

(7-1-95)

450

SP1 G112 D

Subsurface information is available on the roadway and structure portions of this project.

**MAINTENANCE OF THE PROJECT:**

(11-20-07) (Rev. 1-17-12)

104-10

SP1 G125

Revise the *2018 Standard Specifications* as follows:

**Page 1-39, Article 104-10 Maintenance of the Project, line 25**, add the following after the first sentence of the first paragraph:

All guardrail/guiderail within the project limits shall be included in this maintenance.

**Page 1-39, Article 104-10 Maintenance of the Project, line 30**, add the following as the last sentence of the first paragraph:

The Contractor shall perform weekly inspections of guardrail and guiderail and shall report damages to the Engineer on the same day of the weekly inspection. *Where damaged guardrail or guiderail is repaired or replaced as a result of maintaining the project in accordance with this article, such repair or replacement shall be performed within 7 consecutive calendar days of such inspection report.*

**Page 1-39, Article 104-10 Maintenance of the Project, lines 42-44**, replace the last sentence of the last paragraph with the following:

The Contractor will not be directly compensated for any maintenance operations necessary, except for maintenance of guardrail/guiderail, as this work will be considered incidental to the work covered by the various contract items. The provisions of Article 104-7, Extra Work, and Article 104-8, Compensation and Record Keeping will apply to authorized maintenance of guardrail/guiderail. Performance of weekly inspections of guardrail/guiderail, and the damage reports required as described above, will be considered to be an incidental part of the work being paid for by the various contract items.

**COOPERATION BETWEEN CONTRACTORS:**

(7-1-95)

105-7

SP1 G133

The Contractor's attention is directed to Article 105-7 of the *2018 Standard Specifications*.

I-5746A / I-5746B (C203867) is located in the vicinity of the southwest end of this project, and is currently under construction.

I-5507 / R-0211EC / U-4714AB (Mecklenburg County) is located in the vicinity of the southwest end of this project, and is anticipated for a July 17, 2018 letting.

P-5705BA (RD-18002 / C204156) is located within the project limits and is currently under construction. The RD-18002 / C204156 Contract is for construction of the columns and foundation for Bent #2 of the new station track bridges over West Trade Street. Contractor access to this section, granted to the RD-18002 / C204156 Contract, will not be available until after the completion of the RD-18002 / C204156 Contract. Upon acceptance of the RD-18002 / C204156 Contract, by the Department, said section will be provided to this project.

In addition to these Contracts, Article 105-7 of the *2018 Standard Specifications* shall apply to, and the Contractor shall coordinate their work with, adjacent contracts being administered by the following entities:

- City of Charlotte, including the contractor for:
  - City of Charlotte Police Station Project
- Charlotte Area Transit System, including the contractor for:
  - CityLYNX Gold Line Phase 2 Project
- Charlotte Department of Transportation
- Charlotte Water
- Norfolk Southern Railway
- Northwood Ravin, including the contractor for:
  - 500 West Trade Development Project

The Contractor on this project shall cooperate with the Contractor working within or adjacent to the limits of this project to the extent that the work can be carried out to the best advantage of all concerned.

**BID DOCUMENTATION:**

(1-1-02) (Rev.8-18-15)

103

SPI G142

**General**

The successful Bidder (Contractor) shall submit the original, unaltered bid documentation or a certified copy of the original, unaltered bid documentation used to prepare the bid for this contract to the Department within 10 days after receipt of notice of award of contract. Such documentation shall be placed in escrow with a banking institution or other bonded document storage facility selected by the Department.

The Department will not execute the contract until the original, unaltered bid documentation or a certified copy of the original, unaltered bid documentation has been received by the Department.

**Terms**

*Bid Documentation* - Bid Documentation shall mean all written information, working papers, computer printouts, electronic media, charts, and all other data compilations which contain or reflect information, data, and calculations used by the Bidder in the preparation of the bid. The term *bid documentation* includes, but is not limited to, contractor equipment rates, contractor overhead rates, labor rates, efficiency or productivity factors, arithmetical calculations, and quotations from subcontractors and material suppliers to the extent that such rates and quotations were used by the Bidder in formulating and determining the bid. The term *bid documentation* also includes any manuals, which are standard to the industry used by the Bidder in determining the bid. Such manuals may be included in the bid documentation by reference. Such reference shall include the name and date of the publication and the publisher. *Bid Documentation* does not include bid documents provided by the Department for use by the Bidder in bidding on this project. The Bid Documentation can be in the form of electronic submittal (i.e. thumb drive) or paper. If the Bidder elects to submit the Bid Documentation in electronic format, the Department requires a backup submittal (i.e. a second thumb drive) in case one is corrupted.

*Contractor's Representative* - Officer of the Contractor's company; if not an officer, the Contractor shall supply a letter signed and notarized by an officer of the Contractor's company, granting permission for the representative to sign the escrow agreement on behalf of the Contractor.

*Escrow Agent* - Officer of the select banking institution or other bonded document storage facility authorized to receive and release bid documentation.

**Escrow Agreement Information**

A draft copy of the Escrow Agreement will be mailed to the Bidder after the notice of award for informational purposes. The Bidder and Department will sign the actual Escrow Agreement at the time the bid documentation is delivered to the Escrow Agent.

**Failure to Provide Bid Documentation**

The Bidder's failure to provide the original, unaltered bid documentation or a certified copy of the original, unaltered bid documentation within 10 days after the notice of award is received may be just cause for rescinding the award of the contract and may result in the removal of the Bidder

from the Department's list of qualified bidders for a period of up to 180 days. Award may then be made to the next lowest responsible bidder or the work may be readvertised and constructed under the contract or otherwise, as the Department may decide.

### **Submittal of Bid Documentation**

- (A) Appointment – Email [specs@ncdot.gov](mailto:specs@ncdot.gov) or call 919.707.6900 to schedule an appointment.
- (B) Delivery - A representative of the Bidder shall deliver the original, unaltered bid documentation or a certified copy of the original, unaltered bid documentation to the Department, in a container suitable for sealing, within 10 days after the notice of award is received.
- (C) Packaging – The container shall be no larger than 15.5 inches in length by 12 inches wide by 11 inches high and shall be water resistant. The container shall be clearly marked on the face and the back of the container with the following information: Bid Documentation, Bidder's Name, Bidder's Address, Date of Escrow Submittal, Contract Number, TIP Number if applicable, and County.

### **Affidavit**

Bid documentation will be considered a certified copy if the Bidder includes an affidavit stating that the enclosed documentation is an EXACT copy of the original documentation used by the Bidder to determine the bid for this project. The affidavit shall also list each bid document with sufficient specificity so a comparison may be made between the list and the bid documentation to ensure that all of the bid documentation listed in the affidavit has been enclosed for escrow. The affidavit shall attest that the affiant has personally examined the bid documentation, that the affidavit lists all of the documents used by the Bidder to determine the bid for this project, and that all bid documentation has been included. The affidavit shall be signed by a chief officer of the company, have the person's name and title typed below the signature, and the signature shall be notarized at the bottom of the affidavit.

### **Verification**

Upon delivery of the bid documentation, the Department's Contract Officer and the Bidder's representative will verify the accuracy and completeness of the bid documentation compared to the affidavit. Should a discrepancy exist, the Bidder's representative shall immediately furnish the Department's Contract Officer with any other needed bid documentation. The Department's Contract Officer upon determining that the bid documentation is complete will, in the presence of the Bidder's representative, immediately place the complete bid documentation and affidavit in the container and seal it. Both parties will deliver the sealed container to the Escrow Agent for placement in a safety deposit box, vault, or other secure accommodation.

**Confidentiality of Bid Documentation**

The bid documentation and affidavit in escrow are, and will remain, the property of the Bidder. The Department has no interest in, or right to, the bid documentation and affidavit other than to verify the contents and legibility of the bid documentation unless the Contractor gives written notice of intent to file a claim, files a written claim, files a written and verified claim, or initiates litigation against the Department. In the event of such written notice of intent to file a claim, filing of a written claim, filing a written and verified claim, or initiation of litigation against the Department, or receipt of a letter from the Contractor authorizing release, the bid documentation and affidavit may become the property of the Department for use in considering any claim or in litigation as the Department may deem appropriate.

Any portion or portions of the bid documentation designated by the Bidder as a *trade secret* at the time the bid documentation is delivered to the Department's Contract Officer shall be protected from disclosure as provided by *G.S. 132-1.2*.

**Duration and Use**

The bid documentation and affidavit shall remain in escrow until 60 calendar days from the time the Contractor receives the final estimate; or until such time as the Contractor:

- (A) Gives written notice of intent to file a claim,
- (B) Files a written claim,
- (C) Files a written and verified claim,
- (D) Initiates litigation against the Department related to the contract; or
- (E) Authorizes in writing its release.

Upon the giving of written notice of intent to file a claim, filing a written claim, filing a written and verified claim, or the initiation of litigation by the Contractor against the Department, or receipt of a letter from the Contractor authorizing release, the Department may obtain the release and custody of the bid documentation.

The Bidder certifies and agrees that the sealed container placed in escrow contains all of the bid documentation used to determine the bid and that no other bid documentation shall be relevant or material in litigation over claims brought by the Contractor arising out of this contract.

**Release of Bid Documentation to the Contractor**

If the bid documentation remains in escrow 60 calendar days after the time the Contractor receives the final estimate and the Contractor has not filed a written claim, filed a written and verified claim, or has not initiated litigation against the Department related to the contract, the Department will instruct the Escrow Agent to release the sealed container to the Contractor.

The Contractor will be notified by certified letter from the Escrow Agent that the bid documentation will be released to the Contractor. The Contractor or his representative shall retrieve the bid documentation from the Escrow Agent within 30 days of the receipt of the certified letter. If the Contractor does not receive the documents within 30 days of the receipt of the certified

letter, the Department will contact the Contractor to determine final dispersion of the bid documentation.

### Payment

The cost of the escrow will be borne by the Department. There will be no separate payment for all costs of compilation of the data, container, or verification of the bid documentation. Payment at the various contract unit or lump sum prices in the contract will be full compensation for all such costs.

### **TWELVE MONTH GUARANTEE:**

(7-15-03)

108

SP1 G145

- (A) The Contractor shall guarantee materials and workmanship against latent and patent defects arising from faulty materials, faulty workmanship or negligence for a period of twelve months following the date of final acceptance of the work for maintenance and shall replace such defective materials and workmanship without cost to the Department. The Contractor will not be responsible for damage due to faulty design, normal wear and tear, for negligence on the part of the Department, and/or for use in excess of the design.
- (B) Where items of equipment or material carry a manufacturer's guarantee for any period in excess of twelve months, then the manufacturer's guarantee shall apply for that particular piece of equipment or material. The Department's first remedy shall be through the manufacturer although the Contractor is responsible for invoking the warranted repair work with the manufacturer. The Contractor's responsibility shall be limited to the term of the manufacturer's guarantee. NCDOT would be afforded the same warranty as provided by the Manufacturer.

This guarantee provision shall be invoked only for major components of work in which the Contractor would be wholly responsible for under the terms of the contract. Examples would include pavement structures, bridge components, and sign structures. This provision will not be used as a mechanism to force the Contractor to return to the project to make repairs or perform additional work that the Department would normally compensate the Contractor for. In addition, routine maintenance activities (i.e. mowing grass, debris removal, ruts in earth shoulders,) are not parts of this guarantee.

Appropriate provisions of the payment and/or performance bonds shall cover this guarantee for the project.

To ensure uniform application statewide the Division Engineer will forward details regarding the circumstances surrounding any proposed guarantee repairs to the Chief Engineer for review and approval prior to the work being performed.

### **EROSION AND SEDIMENT CONTROL/STORMWATER CERTIFICATION:**

(1-16-07) (Rev 11-22-16)

105-16, 225-2, 16

SP1 G180

### General

Schedule and conduct construction activities in a manner that will minimize soil erosion and the resulting sedimentation and turbidity of surface waters. Comply with the requirements herein

regardless of whether or not a National Pollution discharge Elimination System (NPDES) permit for the work is required.

Establish a chain of responsibility for operations and subcontractors' operations to ensure that the *Erosion and Sediment Control/Stormwater Pollution Prevention Plan* is implemented and maintained over the life of the contract.

- (A) *Certified Supervisor* - Provide a certified Erosion and Sediment Control/Stormwater Supervisor to manage the Contractor and subcontractor operations, insure compliance with Federal, State and Local ordinances and regulations, and manage the Quality Control Program.
- (B) *Certified Foreman* - Provide a certified, trained foreman for each construction operation that increases the potential for soil erosion or the possible sedimentation and turbidity of surface waters.
- (C) *Certified Installer* - Provide a certified installer to install or direct the installation for erosion or sediment/stormwater control practices.
- (D) *Certified Designer* - Provide a certified designer for the design of the erosion and sediment control/stormwater component of reclamation plans and, if applicable, for the design of the project erosion and sediment control/stormwater plan.

### **Roles and Responsibilities**

- (A) *Certified Erosion and Sediment Control/Stormwater Supervisor* - The Certified Supervisor shall be Level II and responsible for ensuring the erosion and sediment control/stormwater plan is adequately implemented and maintained on the project and for conducting the quality control program. The Certified Supervisor shall be on the project within 24 hours notice from initial exposure of an erodible surface to the project's final acceptance. Perform the following duties:
  - (1) **Manage Operations** - Coordinate and schedule the work of subcontractors so that erosion and sediment control/stormwater measures are fully executed for each operation and in a timely manner over the duration of the contract.
    - (a) Oversee the work of subcontractors so that appropriate erosion and sediment control/stormwater preventive measures are conformed to at each stage of the work.
    - (b) Prepare the required National Pollutant Discharge Elimination System (NPDES) Inspection Record and submit to the Engineer.
    - (c) Attend all weekly or monthly construction meetings to discuss the findings of the NPDES inspection and other related issues.
    - (d) Implement the erosion and sediment control/stormwater site plans requested.
    - (e) Provide any needed erosion and sediment control/stormwater practices for the Contractor's temporary work not shown on the plans, such as, but not



- limited to work platforms, temporary construction, pumping operations, plant and storage yards, and cofferdams.
- (f) Acquire applicable permits and comply with requirements for borrow pits, dewatering, and any temporary work conducted by the Contractor in jurisdictional areas.
  - (g) Conduct all erosion and sediment control/stormwater work in a timely and workmanlike manner.
  - (h) Fully perform and install erosion and sediment control/stormwater work prior to any suspension of the work.
  - (i) Coordinate with Department, Federal, State and Local Regulatory agencies on resolution of erosion and sediment control/stormwater issues due to the Contractor's operations.
  - (j) Ensure that proper cleanup occurs from vehicle tracking on paved surfaces or any location where sediment leaves the Right-of-Way.
  - (k) Have available a set of erosion and sediment control/stormwater plans that are initialed and include the installation date of Best Management Practices. These practices shall include temporary and permanent groundcover and be properly updated to reflect necessary plan and field changes for use and review by Department personnel as well as regulatory agencies.
- (2) Requirements set forth under the NPDES Permit - The Department's NPDES Stormwater permit (NCS000250) outlines certain objectives and management measures pertaining to construction activities. The permit references *NCG010000, General Permit to Discharge Stormwater* under the NPDES, and states that the Department shall incorporate the applicable requirements into its delegated Erosion and Sediment Control Program for construction activities disturbing one or more acres of land. The Department further incorporates these requirements on all contracted bridge and culvert work at jurisdictional waters, regardless of size. Some of the requirements are, but are not limited to:
- (a) Control project site waste to prevent contamination of surface or ground waters of the state, i.e. from equipment operation/maintenance, construction materials, concrete washout, chemicals, litter, fuels, lubricants, coolants, hydraulic fluids, any other petroleum products, and sanitary waste.
  - (b) Inspect erosion and sediment control/stormwater devices and stormwater discharge outfalls at least once every 7 calendar days and within 24 hours after a rainfall event of 0.5 inch that occurs within a 24 hour period. Additional monitoring may be required at the discretion of Division of Water Resources personnel if the receiving stream is 303(d) listed for turbidity and the project has had documented problems managing turbidity.
  - (c) Maintain an onsite rain gauge or use the Department's Multi-Sensor Precipitation Estimate website to maintain a daily record of rainfall amounts and dates.
  - (d) Maintain erosion and sediment control/stormwater inspection records for review by Department and Regulatory personnel upon request.
  - (e) Implement approved reclamation plans on all borrow pits, waste sites and staging areas.

- (f) Maintain a log of turbidity test results as outlined in the Department's Procedure for Monitoring Borrow Pit Discharge.
  - (g) Provide secondary containment for bulk storage of liquid materials.
  - (h) Provide training for employees concerning general erosion and sediment control/stormwater awareness, the Department's NPDES Stormwater Permit NCS000250 requirements, and the applicable requirements of the *General Permit, NCG010000*.
  - (i) Report violations of the NPDES permit to the Engineer immediately who will notify the Division of Water Quality Regional Office within 24 hours of becoming aware of the violation.
- (3) Quality Control Program - Maintain a quality control program to control erosion, prevent sedimentation and follow provisions/conditions of permits. The quality control program shall:
- (a) Follow permit requirements related to the Contractor and subcontractors' construction activities.
  - (b) Ensure that all operators and subcontractors on site have the proper erosion and sediment control/stormwater certification.
  - (c) Notify the Engineer when the required certified erosion and sediment control/stormwater personnel are not available on the job site when needed.
  - (d) Conduct the inspections required by the NPDES permit.
  - (e) Take corrective actions in the proper timeframe as required by the NPDES permit for problem areas identified during the NPDES inspections.
  - (f) Incorporate erosion control into the work in a timely manner and stabilize disturbed areas with mulch/seed or vegetative cover on a section-by-section basis.
  - (g) Use flocculants approved by state regulatory authorities where appropriate and where required for turbidity and sedimentation reduction.
  - (h) Ensure proper installation and maintenance of temporary erosion and sediment control devices.
  - (i) Remove temporary erosion or sediment control devices when they are no longer necessary as agreed upon by the Engineer.
  - (j) The Contractor's quality control and inspection procedures shall be subject to review by the Engineer. Maintain NPDES inspection records and make records available at all times for verification by the Engineer.
- (B) *Certified Foreman* - At least one Certified Foreman shall be onsite for each type of work listed herein during the respective construction activities to control erosion, prevent sedimentation and follow permit provisions:
- (1) Foreman in charge of grading activities
  - (2) Foreman in charge of bridge or culvert construction over jurisdictional areas
  - (3) Foreman in charge of utility activities

The Contractor may request to use the same person as the Level II Supervisor and Level II Foreman. This person shall be onsite whenever construction activities as described above are taking place. This request shall be approved by the Engineer prior to work beginning.

The Contractor may request to name a single Level II Foreman to oversee multiple construction activities on small bridge or culvert replacement projects. This request shall be approved by the Engineer prior to work beginning.

(C) *Certified Installers* - Provide at least one onsite, Level I Certified Installer for each of the following erosion and sediment control/stormwater crew:

- (1) Seeding and Mulching
- (2) Temporary Seeding
- (3) Temporary Mulching
- (4) Sodding
- (5) Silt fence or other perimeter erosion/sediment control device installations
- (6) Erosion control blanket installation
- (7) Hydraulic tackifier installation
- (8) Turbidity curtain installation
- (9) Rock ditch check/sediment dam installation
- (10) Ditch liner/matting installation
- (11) Inlet protection
- (12) Riprap placement
- (13) Stormwater BMP installations (such as but not limited to level spreaders, retention/detention devices)
- (14) Pipe installations within jurisdictional areas

If a Level I *Certified Installer* is not onsite, the Contractor may substitute a Level II Foreman for a Level I Installer, provided the Level II Foreman is not tasked to another crew requiring Level II Foreman oversight.

(D) *Certified Designer* - Include the certification number of the Level III-B Certified Designer on the erosion and sediment control/stormwater component of all reclamation plans and if applicable, the certification number of the Level III-A Certified Designer on the design of the project erosion and sediment control/stormwater plan.

### **Preconstruction Meeting**

Furnish the names of the *Certified Erosion and Sediment Control/Stormwater Supervisor*, *Certified Foremen*, *Certified Installers* and *Certified Designer* and notify the Engineer of changes in certified personnel over the life of the contract within 2 days of change.

### **Ethical Responsibility**

Any company performing work for the North Carolina Department of Transportation has the ethical responsibility to fully disclose any reprimand or dismissal of an employee resulting from improper testing or falsification of records.

**Revocation or Suspension of Certification**

Upon recommendation of the Chief Engineer to the certification entity, certification for *Supervisor, Certified Foremen, Certified Installers* and *Certified Designer* may be revoked or suspended with the issuance of an *Immediate Corrective Action (ICA), Notice of Violation (NOV)*, or *Cease and Desist Order* for erosion and sediment control/stormwater related issues.

The Chief Engineer may recommend suspension or permanent revocation of certification due to the following:

- (A) Failure to adequately perform the duties as defined within this certification provision.
- (B) Issuance of an ICA, NOV, or Cease and Desist Order.
- (C) Failure to fully perform environmental commitments as detailed within the permit conditions and specifications.
- (D) Demonstration of erroneous documentation or reporting techniques.
- (E) Cheating or copying another candidate's work on an examination.
- (F) Intentional falsification of records.
- (G) Directing a subordinate under direct or indirect supervision to perform any of the above actions.
- (H) Dismissal from a company for any of the above reasons.
- (I) Suspension or revocation of one's certification by another entity.

Suspension or revocation of a certification will be sent by certified mail to the certificant and the Corporate Head of the company that employs the certificant.

A certificant has the right to appeal any adverse action which results in suspension or permanent revocation of certification by responding, in writing, to the Chief Engineer within 10 calendar days after receiving notice of the proposed adverse action.

Chief Engineer  
1536 Mail Service Center  
Raleigh, NC 27699-1536

Failure to appeal within 10 calendar days will result in the proposed adverse action becoming effective on the date specified on the certified notice. Failure to appeal within the time specified will result in a waiver of all future appeal rights regarding the adverse action taken. The certificant will not be allowed to perform duties associated with the certification during the appeal process.

The Chief Engineer will hear the appeal and make a decision within 7 days of hearing the appeal. Decision of the Chief Engineer will be final and will be made in writing to the certificant.

If a certification is temporarily suspended, the certificant shall pass any applicable written examination and any proficiency examination, at the conclusion of the specified suspension period, prior to having the certification reinstated.

**Measurement and Payment**

*Certified Erosion and Sediment Control/Stormwater Supervisor, Certified Foremen, Certified Installers and Certified Designer* will be incidental to the project for which no direct compensation will be made.

**PROCEDURE FOR MONITORING BORROW PIT DISCHARGE:**

(2-20-07) (Rev. 3-19-13)

105-16, 230, 801

SPI G181

Water discharge from borrow pit sites shall not cause surface waters to exceed 50 NTUs (nephelometric turbidity unit) in streams not designated as trout waters and 10 NTUs in streams, lakes or reservoirs designated as trout waters. For lakes and reservoirs not designated as trout waters, the turbidity shall not exceed 25 NTUs. If the turbidity exceeds these levels due to natural background conditions, the existing turbidity level shall not be increased.

If during any operating day, the downstream water quality exceeds the standard, the Contractor shall do all of the following:

- (A) Either cease discharge or modify the discharge volume or turbidity levels to bring the downstream turbidity levels into compliance, or
- (B) Evaluate the upstream conditions to determine if the exceedance of the standard is due to natural background conditions. If the background turbidity measurements exceed the standard, operation of the pit and discharge can continue as long as the stream turbidity levels are not increased due to the discharge.
- (C) Measure and record the turbidity test results (time, date and sampler) at all defined sampling locations 30 minutes after startup and at a minimum, one additional sampling of all sampling locations during that 24-hour period in which the borrow pit is discharging.
- (D) Notify DWQ within 24 hours of any stream turbidity standard exceedances that are not brought into compliance.

During the Environmental Assessment required by Article 230-4 of the *2018 Standard Specifications*, the Contractor shall define the point at which the discharge enters into the State's surface waters and the appropriate sampling locations. Sampling locations shall include points upstream and downstream from the point at which the discharge enters these waters. Upstream sampling location shall be located so that it is not influenced by backwater conditions and represents natural background conditions. Downstream sampling location shall be located at the point where complete mixing of the discharge and receiving water has occurred.

The discharge shall be closely monitored when water from the dewatering activities is introduced into jurisdictional wetlands. Any time visible sedimentation (deposition of sediment) on the wetland surface is observed, the dewatering activity will be suspended until turbidity levels in the stilling basin can be reduced to a level where sediment deposition does not occur. Staining of wetland surfaces from suspended clay particles, occurring after evaporation or infiltration, does not constitute sedimentation. No activities shall occur in wetlands that adversely affect the functioning of a wetland. Visible sedimentation will be considered an indication of possible adverse impacts on wetland use.

The Engineer will perform independent turbidity tests on a random basis. These results will be maintained in a log within the project records. Records will include, at a minimum, turbidity test results, time, date and name of sampler. Should the Department's test results exceed those of the Contractor's test results, an immediate test shall be performed jointly with the results superseding the previous test results of both the Department and the Contractor.

The Contractor shall use the *NCDOT Turbidity Reduction Options for Borrow Pits Matrix*, available at [http://www.ncdot.gov/doh/operations/dp\\_chief\\_eng/roadside/fieldops/downloads/Files/TurbidityReductionOptionSheet.pdf](http://www.ncdot.gov/doh/operations/dp_chief_eng/roadside/fieldops/downloads/Files/TurbidityReductionOptionSheet.pdf) to plan, design, construct, and maintain BMPs to address water quality standards. Tier I Methods include stilling basins which are standard compensatory BMPs. Other Tier I methods are noncompensatory and shall be used when needed to meet the stream turbidity standards. Tier II Methods are also noncompensatory and are options that may be needed for protection of rare or unique resources or where special environmental conditions exist at the site which have led to additional requirements being placed in the DWQ's 401 Certifications and approval letters, Isolated Wetland Permits, Riparian Buffer Authorization or a DOT Reclamation Plan's Environmental Assessment for the specific site. Should the Contractor exhaust all Tier I Methods on a site exclusive of rare or unique resources or special environmental conditions, Tier II Methods may be required by regulators on a case by case basis per supplemental agreement.

The Contractor may use cation exchange capacity (CEC) values from proposed site borings to plan and develop the bid for the project. CEC values exceeding 15 milliequivalents per 100 grams of soil may indicate a high potential for turbidity and should be avoided when dewatering into surface water is proposed.

No additional compensation for monitoring borrow pit discharge will be paid.

### **SUPERVISION BY CONTRACTOR:**

At all times during the life of the project the Contractor shall provide one permanent employee who shall have the authority and capability for overall responsibility of the project and who shall be personally available at the work site within 24 hours notice. Such employee shall be fully authorized to conduct all business with the subcontractors, to negotiate and execute all supplemental agreements, and to execute the orders or directions of the Engineer.

At all times work is actually being performed, the Contractor shall have present on the project one competent individual who is authorized to act in a supervisory capacity over all work on the project, including work subcontracted. The individual who has been so authorized shall be experienced in the type of work being performed and shall be fully capable of managing, directing, and coordinating the work; of reading and thoroughly understanding the contract, and plans; and receiving and carrying out directions from the Engineer or his authorized representatives. He shall be an employee of the Contractor and carry a current OSHA 10-hour certification and a current certified safety professional (CSP) license unless otherwise approved by the Engineer.

The Contractor may, at his option, designate one employee to meet the requirements of both positions. However, whenever the designated employee is absent from the work site, an authorized individual qualified to act in a supervisory capacity on the project shall be present or Contractor will suspend any or all work activities, at the discretion of the Engineer. Insufficient project supervision will not constitute grounds for extension of the contract time.

**SPECIAL EVENTS REQUIREMENTS:**

Additional work restrictions at 6<sup>th</sup> St, 5<sup>th</sup> St, Trade St and 4<sup>th</sup> St are anticipated during special events in the uptown Charlotte area. The contractor shall obtain schedules for special events and coordinate with the Engineer and CDOT to determine the necessity for work stoppages to accommodate increased pedestrian and vehicle traffic. Special events include but are not limited to:

1. Charlotte Knights baseball games - [www.bbtballparkcharlotte.com](http://www.bbtballparkcharlotte.com)
2. Carolina Panthers football games - [www.panthers.com](http://www.panthers.com)
3. Charlotte Hornets basketball games - [www.nba.com/hornets/](http://www.nba.com/hornets/)
4. Charlotte Marathon - <http://runcharlotte.com/>
5. Various festivals - [www.charlottecentercity.org/events/festivals/](http://www.charlottecentercity.org/events/festivals/)

The City of Charlotte holds up to 5 sporting events per year at Bank of America Stadium in addition to the Carolina Panthers football games.

For bidding purposes, the contractor shall assume that **100** special events will occur per calendar year. During these special events, the Contractor shall not further restrict vehicular and pedestrian traffic flow above that required in the Traffic Management Plans, or as directed by the Engineer.

Special events work restrictions in the vicinity of the P&N bridge are included in the *Bank of America Stadium Requirements* special provision.

**SITE SPECIFIC SAFETY PLAN:**

In accordance with Article 107-21 of the Standard Specifications, the Contractor shall comply with all applicable Federal, State, and local laws, ordinances, and regulations governing safety, health, and sanitation, and must provide all safeguards, safety devices, and protective equipment, and has the duty to take any other needed actions, on his own responsibility that are reasonably necessary to protect the life and health of employees on the job and the safety of the public, and to protect property in connection with the performance of the work covered by the contract. The Contractor shall assure that all subcontractors and other contracts for services for this project shall have the mandated provisions of these requirements in their contracts.

In addition to Article 107-21 of the Standard Specifications, the contractor shall comply with all applicable Norfolk Southern Railroad and CATS Light Rail Roadway Worker Protection rules governing safety, health, and sanitation.

Before commencement of work, the contractor shall provide in an electronic format, a Site Specific Safety Plan (SSSP). If the contractor's safety policy is referenced, a full electronic copy of that policy shall be provided with the SSSP. The contractor shall submit a signed affidavit stating that the provided SSSP fully complies with all applicable Federal, State, and local laws, ordinances, and regulations, Norfolk Southern Railway, and CATS Light Rail Roadway Worker Protection rules. The contractor is required to review and update as necessary the SSSP, providing prompt updates to the Engineer. An update shall be submitted monthly at a minimum throughout the duration of the project. These updates shall be submitted with a signed affidavit stating the plan is still in compliance or has been updated to meet compliance. Updates must also include

immediate notification of any changes in the contractors assigned project management staff or responsible person. The Department will accept a copy of the SSSP but will not provide approval or detailed change requirements. The Department will provide feedback for Contractor benefit, but the Contractor shall maintain responsibility for the plan and performance.

At a minimum the following information shall be addressed in the contractor's "Site Specific Safety Plan" along with any additional information required to comply with all applicable Federal, State, and local laws, ordinances, and regulations, Norfolk Southern Railway, and CATS Light Rail Roadway Worker Protection rules governing safety, health, and sanitation.

- A. Emergency action plan
- B. Plan shall include the following at minimum: Traffic control procedures, truck and delivery management, site visitor policies, identification of known hazards, process for bringing safety issues to prime to address, subcontractor compliance with policies and local authorities (including Norfolk Southern and BOA).
- C. Plan shall include minimum quality standards for addressing safety, including, as a minimum the following: Assessed level of risk, Safety for workers, safety for Norfolk Southern, safety for adjacent properties, protection of pedestrians and travelling public, trespassing, means of addressing issues within the project, means of communicating to parties outside of the project.
- D. Plan shall include security of materials and equipment. Plan shall include protective devices lighting, security cameras, security forces and call boxes as necessary. Additional coordination with BOA security regarding security cameras for BOA use will be necessary.
- E. Plan shall address verification of employees, monitoring behaviors of concern and addressing.
- F. Plan shall acknowledge adjacent events and areas of elevated concerns.
  - a. A portion of the project is adjacent to Bank of America Stadium. The plan will address their procedures/policies to coordinate with local/State/federal law enforcement, City of Charlotte, and Panther Safety personnel for additional safety and security measures during major public events.
- G. Address procedures for acquiring and maintaining e-RAILSAFE, Norfolk Southern Roadway Worker Protection, and CATS Light Rail Roadway Worker Protection training and certification for employees or employees of any subcontractors throughout the duration of the project.
- H. Address Hazard and policy communication practices, incorporation of subcontractor and craft specific safety plans and disciplinary action plans for contractor and all personnel in the contractor's charge, including visitors

Within railroad right-of-way, Norfolk Southern Railway safety requirements take precedence over federal, state and local safety requirements.



**RAILROAD SAFETY JOB BRIEFINGS:**

*Add the following to Standard Specification 108-4:*

In addition to construction conferences, the contractor shall perform daily railroad safety job briefings with the railroad flagman before commencing work. The attendees of the job briefing shall include anyone who will be entering the work zone during that work period. All contractor and subcontractor supervisory staff, craftsmen, unskilled labor who will be in or entering the work zone shall be in attendance during the safety briefings. Individuals who enter the work zone after the safety briefing has already been conducted shall receive the job briefing from the contractor's employee in charge prior to entry.

**PREQUALIFICATION OF CONTRACTORS:**

In order to be awarded this project the prime contractor shall be prequalified for work code 5090 "Right-of-Way Prime Contractor". Applications for prequalification in work code 5090 must be transmitted to and received by Mr. Mickey Biedell, PE, State Qualifications Engineer no later than 5:00 p.m. on Thursday May 24<sup>th</sup>, 2018. If the apparent low bidder is not prequalified for work code 5090 at the time of bid, the deadline for getting this prequalification is 10:00 a. m. on the sixth calendar day following the opening of bids. If the apparent low bidder cannot obtain the required 5090 work code by this deadline the Department will consider their bid non-responsive and will move to the next lowest responsible/responsive bidder.

**NOTIFICATION OF OPERATIONS:**

The Contractor shall notify the Engineer a minimum of 48 hours in advance of beginning work on this project. Some work, including work that will require railroad oversight or Bank of America security will require notice on the order of 15 or more days. The Contractor shall give the Engineer sufficient notice of all operations for any sampling, inspection or acceptance testing required.

**MATERIALS AND TESTING:**

The Engineer reserves the right to perform all sampling and testing in accordance with Section 106 of the *Standard Specifications* and the Department's "Materials and Tests Manual." However, the Engineer may reduce or increase the frequency of sampling and testing where he deems it appropriate for the project under construction.

Additional sampling and testing activities will not be considered grounds for Contractor-caused delays.

**LOCATING EXISTING UNDERGROUND UTILITIES:**

*Add the following to Standard Specification section 105-8:*

Underground railroad communication utilities are not located by independent utility locating services. Prior to construction activities, the contractor shall coordinate with the Engineer and the Railroad to have underground railroad communication utilities located by the railroad signal department.

The contractor shall also locate all existing underground storm water pipes and storm water drainage structures prior to construction activities. The data collected shall include all horizontal and vertical information of pipe and drainage structure inverts, pipe sizes and pipe materials.

**COORDINATION OF PLANS, SPECIFICATIONS, SUPPLEMENTAL SPECIFICATIONS AND SPECIAL PROVISIONS:**

*Add the following to the end of Standard Specification 105-4:*

*Norfolk Southern Standard Special Provisions for the Protection of Railway Interests* (included herein as Appendix A) shall govern over *NC DOT Standard Specifications*.

The Special and Project Special Provisions herein shall govern over Appendix A.

Federal Aid Construction Standard Special Provisions shall govern over Appendix A and the Special and Project Special Provisions herein.

**CONTRACTOR WORK PLANS:**

The Contractor shall submit a workplan to the Engineer for review and concurrence. The Contractor may not begin work until this workplan is reviewed with all comments addressed. The workplan will be subject to updates based on current site conditions. All costs and time for generating keeping workplan updated will be incidental to the Mobilization Bid item in the contract. The basic elements of the workplan shall include the following basic elements for each stage of construction:

1. To scale site plans and elevations with existing infrastructure shown
2. Written narrative of workplan with hours of operation and flagging schedule
3. Contaminated soil and water disposal plan, including any proposed storage areas on or off site.
4. Signed agreements for any staging areas not within the project site

The content contained in the workplan shall be responsive to the following administrative safety and security requirements listed in these special provisions most notably in the following sections:

1. The Crane Safety requirements in the special provisions and *Appendix A, Norfolk Southern Standard Special Provisions for Protection of Railway Interests*.
2. Locations of concrete pump and drill rig and any other significant equipment needed during each stage of operations.
3. Safety and security requirements described within the *Site Specific Safety Plan* project special provision.
4. Erosion and sediment control requirements.
5. Underground utility information found during the Contractors utility survey, with utilities marked to remain or to be abandoned.
6. All other applicable requirements listed in *Appendix A, Norfolk Southern Standard Special Provisions for Protection of Railway Interests*.
7. Safety, security and access requirements as described in the *Bank of America Stadium Requirements* project special provision.
8. Railroad roadbed access, construction and maintenance

The workplan shall also detail anticipated street and sidewalk closures and be responsive to CDOT requirements on closures of more than one road within the project limits simultaneously.

The proposed workplan shall be submitted for review within 14 days of administrative NTP.

The Contractor shall submit a rolling three week lookahead schedule to the Engineer weekly for review. The schedule shall include anticipated locations of operations, types of operations, dates of operations in those areas and street or sidewalk closures. Each submittal of the schedule shall identify deviations from the previously submitted lookahead schedule, for approval by the Engineer. The format of the schedule shall be provided to the Engineer prior to the first schedule submittal for concurrence.

### **CONSTRUCTION STAKES, LINES AND GRADE:**

The Contractor is responsible for all construction layout, surveying, stakeout, supplemental surveying and engineering necessary for the proper control of construction operations in accordance with this section and the Manual for Construction Layout per Section 801 of the *Standard Specifications* including the following:

The Contractor has a duty to perform construction layout, surveying, stakeout, supplemental surveying and engineering necessary for the proper control of construction operations a minimum of 2 weeks prior to beginning work. Additionally, the Contractor has a duty to inform the Engineer of any discrepancies, inconstancies or issues found prior to beginning work.

The Contractor shall regularly verify the location of working line and control points on a bi-weekly basis during active bridge construction. The Contractor shall provide certification of working line and control verification at every monthly meeting.

### **DUKE ENERGY REQUIREMENTS:**

This special provision applies to all work performed in the vicinity of Duke Energy facilities between **-S1- Sta. 38+90 and -S1- Sta. 43+50.**

#### **Facilities**

The Contractor's attention is directed to the Duke Energy facilities located in close proximity and above the project site within the above station range:

- Overhead transmission line immediately east of project site
- Switch gear/tab bent facility immediately east of project site
- Overhead transmission line crossing project site
- Overhead distribution line crossing project site

#### **Work Plan**

All work performed within the station range above shall be subject to workplan approval by the Engineer and the Duke Energy representative as described herein. The contractor shall submit a detailed work plan for protection of the Duke Energy facilities areas as detailed in the Site Specific Safety Plan and subject to updates based on field conditions. The workplan shall include a written narrative with all activities and sequencing necessary to meet the requirement and plan sheets which include plan elevations sections and details demonstrating the prescribed protection.

These workplan(s) will be subject to Railroad and Duke Energy review and conformance checks. This workplan will be considered a living document and will be subject to monthly update reviews by the railroad and the Duke Energy.

### **Safety Observer**

The Contractor shall coordinate with the Duke Energy contact listed in the Utilities by Others special provisions prior to conducting work. Duke Energy may require that a Duke Energy safety observer be on-site for some or all construction activities occurring near their facilities based on their assessment of the contractor's work plan and Site Specific Safety Plan. If Duke Energy does require a safety observer, the contractor shall be responsible for entering an agreement with Duke Energy to secure and pay for this observer, as needed.

### **Costs and Time Associated with Compliance**

There will be no direct payment for these Duke Energy Requirements. All costs and time associated with the work plan development; execution of work according to the reviewed and conformed work plan; execution of updates to the plan; entering into an agreement with Duke Energy, as needed; and Duke Energy Safety Observers will be incidental to the bid item(s) of the work being affected.

### **CITY STREET CLOSURE RESTRICTIONS:**

It is the Contractor's responsibility to coordinate and schedule street closures on the City streets within the project limits (West 6<sup>th</sup> Street, West 5<sup>th</sup> Street, West Trade Street, West 4<sup>th</sup> Street) with both the Engineer and Charlotte Department of Transportation (CDOT). CDOT shall approve closures with ultimate approval from the Engineer.

The Contractor shall not assume that closing more than one street within the project limits simultaneously will be permitted. Only after approval by the Engineer and CDOT shall the Contractor close more than one street within the project limits simultaneously.

### **TERMS AND DEFINITIONS:**

Unless noted otherwise, the following terms and their associated definitions are applicable throughout these Special Provisions:

<u>Terms</u>	<u>Definitions</u>
AREMA	American Railway Engineering and Maintenance-of-Way Association
BOA	Bank of America Stadium
COC	City of Charlotte
CATS	Charlotte Area Transit System

Railway, Railway Company,  
Railroad, Railroad Company

Norfolk Southern Railway

Railroad Engineer

The authorized representative of the Railway.

### **LIABILITY INSURANCE:**

Revise the *2018 Standard Specifications* as follows:

**Article 107-15 LIABILITY INSURANCE, page 1-64, Lines 9-14,** replace the third and fourth sentences of the second paragraph with the following:

“The State of North Carolina and the City of Charlotte shall be named as additional insured on this commercial general liability policy. The policy may contain the following language as relates to the State and the City as additional insured: ‘This insurance with respect to the additional insured applies only to the extent that the additional insured is held liable for your or your agent’s acts or omissions arising out of and in the course of operations performed for the additional insured.’”

The prime contractor is also required to carry liability insurance required by Norfolk Southern Railway. See *Appendix A, Norfolk Southern Standard Special Provisions for Protection of Railway Interests* for requirements.

### **RAILROAD WORK:**

Project scope includes work within railroad Right of Way (ROW). This contract includes work items to satisfy Department commitments made to the railroad, through other agreements. Details and references to railroad standards committed to by the Department have been included with these documents and shall be the contractor’s responsibility to maintain. Commitments made to the railroads include agreements to fully cooperate with and abide by railroad requirements for safety, communication and prevention of interference with operations. For the purpose of this contract, any reference to Engineer within the contract documents will mean the Department Engineer. The contractor shall receive contract authorization and direction only from the Engineer. The Railroad’s Engineer may provide insight to the Contractor directly, but all information and directives shall be subject to verification by the Department Engineer managing this contract. All submittals, inspections, etc. requiring railroad approval shall be submitted and coordinated through the Department’s Engineer.

At no additional cost or delay claim related to any of the following stipulations, the Contractor shall be knowledgeable and prepared to promptly comply with the following:

(A) Roles and Authorities

The Department will administer and manage the contract. The railroad(s) will retain control of activities within railroad ROW. Additional definitions and roles have been provided within these documents.

(B) Contract Document Precedence

For railroad improvements or work impacting railroads, railroad performance standards provided and referenced herein will take precedence over, but shall not replace, the NCDOT Standard Specifications. The Engineer will determine limits of work impacting railroads. Contractor shall be responsible for understanding and complying with railroad performance standards. This shall include railroad submittal standards and review durations. Protocols not addressed through provided or referenced railroad standards will be determined by the Engineer.

(C) Pre-qualification for Railroad ROW Work

The Contractor and subcontractors shall be subject to pre-qualification, prior to entering the railroad ROW. Requirements shall be as included within these documents and shall apply to any and all subcontractors, unless otherwise determined by the Engineer.

(D) Insurance and/or Bonding Requirements

Prior to entering railroad ROW, the Contractor shall submit evidence that the types and amounts of insurance, deemed proper by the railroad(s), have been obtained.

(E) Safety Training, including annual Roadway Worker Protection (RWP) and biennial e-RAILSAFE

The contractor shall be prepared to verify that required safety training, including RWP and e-RAILSAFE as required by this contract, have been successfully completed, obtained or performed for all people under their charge, prior to date of availability.

Additionally, the Contractor shall be prepared to obtain new safety credentials if the railroad chooses a different vendor to provide the required safety training.

(F) Right of Entry and Communication of Notice

For any work within the railroad ROW, the Contractor shall be responsible for obtaining right of entry from the railroad(s) and providing all notices, and pre-commencement meetings, required by the railroad(s) prior to, construction. The Contractor shall copy the Engineer on any communications with the railroad(s).

(G) Schedules

The Contractor shall be responsible for preparing schedules that include the level of detail outlined in these documents.

(H) Adherence to Railroad Safety Policies

The safety practices on railroad ROW will be at the discretion of the railroad(s). The Contractor will become familiar with written safety policies and meet with representatives of the railroad(s) as necessary to fully comply with the safety policies. The railroad(s) will have the authority to immediately and permanently remove any individual(s) from railroad ROW that compromise safety. Under no circumstances shall any statements or omissions in these documents relieve

the Contractor from fully complying with all applicable Federal Railroad Administration (FRA) or applicable OSHA safety requirements.

(I) Communication with Railroad Personnel

The Contractor shall be responsible for coordinating project communications with railroad personnel, including provision of railroad approved communication devices.

(J) Interference with Railroad Operations

The Contractor shall be responsible for sharing the Department's commitment to prevent any interference with railroad operations and/or maintenance.

(K) Maintenance of Walkways and Hazard Prevention

Within the project limits of the railroad ROW, the Contractor shall be responsible for maintaining walkways where possible, as determined by the Engineer, and preventing potential hazards to railroad personnel.

(L) Availability of Railroad ROW for Work

Ability to access work locations on railroad ROW will vary due to numerous conditions and is not guaranteed to match the Contractor's schedule. The Contractor shall be responsible for coordinating activities in railroad ROW to minimize the effects of these constraints.

(M) Railroad Crossings

Contractor shall become knowledgeable and shall fully comply with railroad regulations and requirements for crossing and/or passing over railroad tracks at-grade. The Contractor shall be responsible for all time and costs necessary to cross and/or pass over tracks, if deemed necessary by the railroad(s).

(N) Railroad ROW Work Submittal Standards

For work within, or in a proximity determined to be a safety risk by the railroad(s), the Contractor shall be responsible for making material and procedural submittals in accordance with the railroad standards outlined in these documents and cited reference documents. Any submittal examples and preliminary submittal lists provided with these documents shall be considered for demonstrative purposes and shall not be considered complete standards for submittals. The Contractor shall coordinate with the Engineer to determine submittal requirements.

(O) Cooperation and Delays

The Contractor shall be responsible for coordinating with the railroad(s) to prevent unnecessary delays to any work associated with this contract.

(P) Railroad ROW Work for the Benefit of the Contractor

The Contractor shall obtain approvals and make arrangements with the railroad(s) in order to perform any work beneficial to the Contractor that is not within the scope of this contract. No compensation will be provided to the Contractor for these arrangements and these arrangements will be subject to determination of no impact on this contract by the Engineer.

(Q) Materials within Railroad ROW:

The Contractor shall handle all materials within railroad ROW in accordance with these documents and any cited reference documents. Unless otherwise determined by the Engineer, the Contractor shall be prepared to handle and stage any materials found in the railroad ROW, without causing the materials to leave the railroad ROW. The Contractor shall coordinate with the railroad(s), through the Engineer, regarding any concealed material or condition; especially including those recognized as having potential for environmental concerns, discovered in or near railroad ROW, prior to handling the material.

(R) Damages and Restoration:

Within railroad ROW, the Contractor shall be responsible for damages and site restoration according to these documents, to the satisfaction of the railroad(s).

Detailed information and references to the above have been provided within these documents and special provisions.

**NIGHT OPERATIONS:**

Verification of any city or county permits required for night work shall be provided to the Engineer if the contractor wants to work at night. Also, before the contractor begins his operations during night hours, he shall submit in writing, a full and complete plan for traffic control and construction lighting which shall be approved by the engineer prior to construction. The night operations plan will also be reviewed by the Engineer and the Railroad for potential impact to railroad operations, and will be subject to approval and updates based on field conditions.

All traffic control devices used outside of closure areas shall meet the requirements for night use as set forth in the North Carolina Department of Transportation Standard 2018 Standard Specifications for Roads and Structures, North Carolina Department of Transportation Roadway Standard Drawings, and the current Charlotte Department of Transportation Work Area Traffic Control Handbook (WATCH).



**BANK OF AMERICA STADIUM REQUIREMENTS:**

This special provision applies to all work performed in the vicinity of Bank of America Stadium, from **-S1- Sta. 41+00 to -S1- Sta. 49+17**.

**Limited Access to Site**

The Contractor's attention is directed to the limited access in this area. The site is bounded closely by the Norfolk Southern mainline track and bridge to the west, Bank of America Stadium fence and property and Duke Energy substation to the east, and Duke Energy transmission and distribution lines above. The Contractor shall not assume that access will be permitted under the existing mainline railroad bridge from the west, or along the pedestrian walkway from Graham St from the east. Contractor shall coordinate and cooperate to eliminate and reduce hindrances to other operations in the vicinity, specifically with the adjacent property owners.

A temporary construction easement at Morehead St will be provided to facilitate access to the area from the south, as shown in the plans. If the Contractor elects to use the easement in any fashion, the Contractor shall submit a plan for the proposed use to the Engineer for approval prior to starting any activities within the easement. The submittal shall address access road location and usage schedule, limits of construction, utility relocations, schedule, method of protecting existing track, and temporary closures of access/clean-up for events at the stadium. The Engineer may consult with the Carolina Panthers and Bank of America Stadium staff to confirm whether the Contractor's proposed use has any impacts on the Bank of America Stadium property or operations, and the contractor shall be prepared to make modifications to grades, install soil retaining structures and relocate utilities in a manner acceptable to the Carolina Panthers and Bank of America Stadium staff. Hauling operations shall be approved by the Engineer. Existing utilities within the easement that are in conflict with any proposed use are the Contractor's responsibility to coordinate and relocate. The Contractor shall have no claims whatsoever against the Department for any delays or costs incurred for elected use of the easement or relocation of utilities for said use.

If the Contractor elects to use the easement, the Contractor shall not store any construction equipment or materials within the easement area and shall keep the easement area and the immediately surrounding area free from trash and debris. Upon completion of the project the Contractor shall return the area to its original grade.

**Pedestrian Walkway Requirements**

The public pedestrian walkway located under the existing railroad bridges is utilized by BOA and Panthers staff and players to transit between the stadium and the practice fields located on the west side of the railroad tracks on a daily basis. Under no circumstances shall the Contractor close or restrict access to the pedestrian walkway except for activities requiring closure as identified in the Intermediate Contract Times and on sheet TMP-3, as identified in the accepted Site Safety and Security Plan, or as otherwise directed by the Engineer. Any closure will be subject to prior notification and receipt of authorization from the Engineer.

The Contractor shall provide a temporary enclosure of the pedestrian walkway prior to demolition of the existing P&N bridge as required by **Pedestrian Walkway, Phase I, Step 2** as shown on sheet **TMP-3**. The enclosure shall remain in place until the Contractor has completed and the Department has accepted Structure 8 (P&N bridge) and is demobilizing from the area.

Minimum requirements for the enclosure are as follows:

- ADA compliant
- Traversable by small wheeled vehicles (golf carts, gators, etc.)
- Provide an inside horizontal clearance of no less than 11'-0"
- Provide an inside vertical clearance of no less than 9'-0"
- Top of the structure shall not be any closer than 2'-0" to the bottom of girders on the Structure 8 (P&N bridge).
- Extend a sufficient distance beyond the width of the proposed construction to mitigate risks identified in the accepted Site Safety and Security Plan, and shall not be less than 15' beyond the limits of the existing lower P&N bridge.
- Designed to withstand likely loads as identified in the accepted Site Safety and Security Plan.

Contractor shall submit drawings, calculations, materials, and means and methods of construction for approval by the Engineer and BOA.

During construction of the temporary pedestrian walkway enclosure, or during other work when the temporary walkway enclosure is not installed, the Contractor shall assume that regular coordination with BOA through the Engineer will be required to identify acceptable work windows and potential for interruptions due to planned or variable BOA operations.

The Contractor shall be responsible for removal of the existing canopy located under the existing bridges, in whole or in part, as necessary to construct the temporary walkway enclosure.

### **Event Schedules**

A calendar of anticipated events at Bank of America stadium will be provided each year by the Engineer to the Contractor when released by BOA. This schedule is not intended to be a comprehensive schedule and the Contractor shall engage in coordination with BOA through the Engineer to obtain updates to the schedules for all events in the vicinity.

### **Work Impediments**

Events at Bank of America stadium may impact the Contractor's ability to access or work in this area on event days. For bidding purposes, the Contractor shall assume 17 events per year will limit or prevent access to this area. For these events, the Contractor may be directed by the Engineer to move all equipment out of this area for security purposes, for at least 3 days.

### **Lookahead Schedule**

The Contractor shall include details of anticipated locations, types, and dates of operations in the station range above in the 3-week lookahead schedule submitted to the Engineer. Any proposed operations within the station range above shall be highlighted in each lookahead schedule update. The Contractor shall coordinate with the Engineer to determine the probability of impacts to BOA operations or events.

### **BUILDING REMOVAL:**

(1-1-02) (Rev. 4-16-13)

215

SP2 R15 A

Remove the buildings, underground storage tanks and appurtenances listed below in accordance with Section 215 of the *2018 Standard Specifications*:

Parcel 022A Block w/brick veneer bus terminal, brick privacy wall and covered bus shelter Left of SS 23+75 to SS 28+00. (Pumps and underground fuel tank removal will be by NCDOT)

### **PROGRESS SCHEDULE:**

Add the following to the end of Standard Specification 108-2:

The schedule shall include activity descriptions with beginning and ending dates, partial completion (in percentage or time format). Railroad roadbed activities should include beginning and ending stations of roadbed section. The schedule shall include activities or milestones indicating when NSR flagmen and construction forces should be mobilized to the site.

In addition to those requirements listed above, the Contractor shall include the following activities or milestones in the schedules, where applicable:

- (A) Beginning and ending dates for each phase or section of railroad roadbed work.
- (B) Beginning and ending dates for each phase of platform and concourse work
- (C) Beginning and ending dates for each phase of work associated with the P&N Greenway area
- (D) Dates when flagging for railroad protection is required and the expected type of flagging required, as coordinated with the Engineer and Railroad Engineer.
- (E) Anticipated dates for removal of erosion control devices.

The Contractor shall continue to submit to the Engineer a schedule on a monthly basis until the work is substantially complete. The contractor shall be prepared to add additional activities/milestones as requested by the engineer. If no changes are required to the schedule dates, the Contractor shall resubmit the previous month's schedule with a revised submittal date and updated percent partial completion. The Contractor may submit an alternate schedule format for approval by the Engineer, to fulfill the monthly schedule update requirement.

### **PROJECT REQUIREMENTS IN THE VICINITY OF THE CATS GOLD LINE PROJECT:**

The City of Charlotte and CATS currently have an in-progress construction project along West Trade Street within the P-5705BA and P-5705BB project limits - entitled the CityLYNX Gold Line Phase 2 project, hereinafter referred to as the Gold Line project - and expect to complete said construction and place the CityLYNX Gold Line Streetcar into service during this contract duration.

The contractor's attention is directed to the Cooperation Between Contractors special provision contained in this document including the CATS contractor for the Gold Line project in the protections and requirements of Section 105-7 of the *Standard Specifications*.

All work performed within 50' of the Gold Line project along Trade St shall be subject to work plan approval by the Engineer. The Contractor shall submit a detailed work plan for protection of the Gold Line project area as detailed in the Site Specific Safety Plan and subject to updates based on field conditions. A list of work activities that will require OCS power outages shall also be included.

This work plan will be subject to Railroad and CATS review and shall be submitted through the Engineer. This work plan will be considered a living document and will be subject to monthly update reviews by the Railroad and CATS. All costs and time associated with the work plan development, execution of work according to the reviewed and conformed work plan, and execution of updates to the plan will be incidental to the bid item(s) of the work being affected.

### **Overhead Contact System**

The Gold Line project will be constructing an overhead contact system (OCS) above the centerline of each track. Once energized, the Contractor shall expect to be subject to additional work restrictions. Girder erection operations or any other operation in the vicinity that requires equipment within 10 feet of the OCS wires or with potential for equipment to fall into this 10 foot buffer will only be permitted during timeframes when the OCS is de-energized. It is anticipated the OCS will be de-energized between 1:00 am and 4:00 am. The Contractor shall perform all necessary construction activities and secure cranes and equipment away from the OCS before the end of the work window. See Intermediate Contract Times for more details.

### **CATS Roadway Worker Training**

The Contractor's personnel and personnel of their sub-contractors who will be present within 50 feet of the Gold Line project must be certified in CATS Roadway Worker Training, maintain copies of training certifications on their persons, and be prepared to present them upon request. This training will be valid for two (2) years from completion and requires retraining at expiration for the duration of the project. CATS Roadway Worker Training will be provided to the contractor free of charge by CATS. Two training dates will be provided at Contractor Mobilization and up to one (1) additional training will be provided per month thereafter. Training dates and times are to be coordinated two (2) weeks in advance with CATS through the Engineer. Penalties for lack of training certifications will include individuals being permanently removed from the project, at no delay or cost to the Department.

### **Milling Around Track Slab**

For milling operations on Trade St to be conducted after the Gold Line concrete track slabs have been constructed, do not perform standard milling operations within one foot of the track slab to avoid damage. Milling within one foot of the concrete track slabs shall be performed with specialized equipment capable of performing the operation without causing damage to the track slab. Contractor shall submit proposed equipment to the Engineer for approval prior to milling operations.

**PROJECT SPECIAL PROVISIONS****ROADWAY****MOBILIZATION:**

*Add the following to Standard Specification 800:*

The contractor shall furnish portable toilets at regular intervals along the project length. For bidding purposes, the Contractor shall assume that a portable toilet shall be located within 500' of any location on the project site.

**BOA MOBILIZATIONS:****DESCRIPTION**

It is anticipated that after initial mobilization to the areas described below, the Contractor will be directed to demobilize and remobilize for the tasks described below. This work shall be performed in accordance with Section 800 of the Standard Specifications and consists of preparatory work and operations to demobilize and remobilize personnel, materials and equipment to a specific area of the project site between **-S1- Sta. 41+00 to -S1- Sta. 49+17** to perform the following separate scopes of work:

Bridge Demolition: *BOA Mobilization* shall include all preparatory work necessary for demolition of the existing bridge at **-A1- Sta. 42+59.46**.

Utility Relocations: *BOA Mobilization* shall include all preparatory work necessary to construct all utility relocations in the station range listed above.

Bridge Substructure: *BOA Mobilization* shall include all preparatory work necessary to construct the substructure of Structure 8 (Abutments 1 and 2, Piers 1 and 2 of the P&N bridge), retaining wall RW-9 and associated temporary shoring.

Bridge Superstructure: *BOA Mobilization* shall include all preparatory work necessary to construct the superstructure of Structure 8 (P&N bridge).

The initial Mobilization for the work described above shall be considered part of the *Mobilization* pay item. Mobilization for all other work in the area including, but not limited to, installation of erosion control, installation of traffic control devices, construction of pedestrian walkway enclosure, grading, drainage and sub-ballast shall be considered part of the *Mobilization* pay item.

**MEASUREMENT AND PAYMENT**

*BOA Mobilizations* will be paid at the contract unit price of each for the individual remobilization occurrences described above when the Engineer determines that a remobilization has occurred, provided the amount bid does not exceed 5% of the total amount bid for the items of work described for each *BOA Mobilization*.

Such price and payment includes, but is not limited to, the movement of personnel, equipment, supplies and incidentals to this specific area of the project site; the removal and disbandment of those personnel, equipment, supplies, incidentals or other facilities that were established for the prosecution of work on the project.

Payment will be made under:

**Pay Item**

BOA Mobilizations

**Pay Unit**

Each

**CLEARING AND GRUBBING - METHOD III:**

(4-6-06) (Rev.8-18-15)

200

SP2 R02B

Perform clearing on this project to the limits established by Method “III” shown on Standard Drawing No. 200.03 of the *2018 Roadway Standard Drawings*. Conventional clearing methods may be used except where permit drawings or conditions have been included in the proposal which require certain areas to be cleared by hand methods.

**BURNING RESTRICTIONS:**

(7-1-95)

200, 210, 215

SP2 R05

Open burning is not permitted on any portion of the right-of-way limits established for this project. Do not burn the clearing, grubbing or demolition debris designated for disposal and generated from the project at locations within the project limits, off the project limits or at any waste or borrow sites in this county. Dispose of the clearing, grubbing and demolition debris by means other than burning, according to state or local rules and regulations.

**SHOULDER AND FILL SLOPE MATERIAL:**

(5-21-02)

235, 560

SP2 R45 B

**Description**

Perform the required shoulder and slope construction for this project in accordance with the applicable requirements of Section 560 and Section 235 of the *2018 Standard Specifications*.

**Measurement and Payment**

When the Contractor elects to obtain material from an area located beneath a proposed fill sections which does not require excavation for any reason other than to generate acceptable shoulder and fill slope material, the work of performing the excavation will be considered incidental to the item of *Borrow Excavation* or *Shoulder Borrow*. If there is no pay item for *Borrow* or *Shoulder Borrow* in the contract, this work will be considered incidental to *Unclassified Excavation*. Stockpile the excavated material in a manner to facilitate measurement by the Engineer. Fill the void created by the excavation of the shoulder and fill slope material with suitable material. Payment for material used from the stockpile will be made at the contract unit price for *Borrow Excavation* or *Shoulder Borrow*. If there is no pay item for *Borrow Excavation* or *Shoulder Borrow*, then the material will be paid for at the contract unit price for *Unclassified Excavation*. The material used to fill the void created by the excavation of the shoulder and fill slope material will be made at the contract unit price for *Unclassified Excavation*, *Borrow Excavation*, or *Shoulder Borrow*, depending on the source of the material.

Material generated from undercut excavation, unclassified excavation or clearing and grubbing operations that is placed directly on shoulders or slope areas, will not be measured separately for payment, as payment for the work requiring the excavation will be considered adequate compensation for depositing and grading the material on the shoulders or slopes.

When undercut excavation is performed at the direction of the Engineer and the material excavated is found to be suitable for use as shoulder and fill slope material, and there is no area on the project currently prepared to receive the material generated by the undercut operation, the Contractor may construct a stockpile for use as borrow at a later date. Payment for the material used from the stockpile will be made at the contract unit price for *Borrow Excavation* or *Shoulder Borrow*.

When shoulder material is obtained from borrow sources or from stockpiled material, payment for the work of shoulder construction will be made at the contract unit price per cubic yard for *Borrow Excavation* or *Shoulder Borrow* in accordance with the applicable provisions of Section 230 or Section 560 of the *2018 Standard Specifications*.

### **MANUFACTURED QUARRY FINES IN EMBANKMENTS:**

(01-17-17)

235

SP02 R72

#### **Description**

This specification addresses the use of manufactured quarry fines that are not classified as select materials. The specification allows the Contractor an option, with the approval of the Engineer, to use manufactured quarry fines (MQFs) in embankments as a substitute for conventional borrow material. Furnish and place geotextile for pavement stabilization in accordance with the Geotextile for Pavement Stabilization special provision and detail. Geotextile for pavement stabilization is required to prevent pavement cracking and provide separation between the subgrade and pavement section at embankment locations where manufactured quarry fines are utilized and as directed by the Engineer.

#### **Materials**

Manufactured Quarry Fines.

Site specific approval of MQFs material will be required prior to beginning construction as detailed in the preconstruction requirements of this provision.

The following MQFs are unacceptable:

- (A) Frozen material,
- (B) Material with a maximum dry unit weight of less than 90 pounds per cubic foot when tested in accordance with AASHTO T-99 Method A or C.
- (C) Material with greater than 80% by weight Passing the #200 sieve

Collect and transport MQFs in a manner that will prevent nuisances and hazards to public health and safety. Moisture condition the MQFs as needed and transport in covered trucks to prevent dusting. If MQFs are blended with natural earth material, follow Borrow Criteria in Section 1018 of the *Standard Specifications*.

#### **Geotextiles**

Areas of embankment where MQFs are incorporated, Geotextile for Pavement Stabilization shall be used. If the Geotextile for Pavement Stabilization special provision is not included elsewhere in this contract, then it along with a detail will be incorporated as part of the contractors request to use. Notification of subgrade elevation, sampling and waiting period as required in the

Construction Methods section of the Geotextile for Pavement Stabilization special provision are not required.

### **Preconstruction Requirements**

When MQFs are to be used as a substitute for earth borrow material, request written approval from the Engineer at least ninety (90) days in advance of the intent to use MQFs and include the following details:

- (A) Description, purpose and location of project.
- (B) Estimated start and completion dates of project.
- (C) Estimated volume of MQFs to be used on project with specific locations and construction details of the placement.
- (D) The names, address, and contact information for the generator of the MQFs.
- (E) Physical location of the site at which the MQFs were generated.

The Engineer will forward this information to the State Materials Engineer for review and material approval.

### **Construction Methods**

Place MQFs in the core of the embankment section with at least 4 feet of earth cover to the outside limits of the embankments or subgrade.

Construct embankments by placing MQFs in level uniform lifts with no more than a lift of 10 inches and compacted to at least a density of 95 percent as determined by test methods in AASHTO T-99, Determination of Maximum Dry Density and Optimum Moisture Content, Method A or C depending upon particle size of the product. Provide a moisture content at the time of compaction of within 4 percent of optimum but not greater than one percent above optimum as determined by AASHTO T-99, Method A or C.

Areas of embankment where MQFs are incorporated, Geotextile for Pavement Stabilization shall be used. See Geotextile for Pavement Stabilization special provision for geotextile type and construction method.

### **Measurement and Payment**

*Borrow Excavation* will be measured by truck volume and paid in cubic yards in accordance with Article 230-5 of the *2018 Standard Specifications*. As an alternate weigh tickets can be provided and payment made by converting weight to cubic yards based on the verifiable unit weight.

Where the pay item of *Geotextile for Pavement Stabilization* is included in the original contract the material will be measured and paid in square yards (see Geotextile for Pavement Stabilization special provision). Where the pay item of *Geotextile for Pavement Stabilization* is not included in the original contract then no payment will be made for this item and will be considered incidental to the use of MQFs in embankment.



**FLOWABLE FILL:**

(9-17-02) (Rev 1-17-12)

300, 340, 1000, 1530, 1540, 1550

SP3 R30

**Description**

This work consists of all work necessary to place flowable fill in accordance with these provisions, the plans, and as directed.

**Materials**

Refer to Division 10 of the *2018 Standard Specifications*.

<b>Item</b>	<b>Section</b>
Flowable Fill	1000-6

**Construction Methods**

Discharge flowable fill material directly from the truck into the space to be filled, or by other approved methods. The mix may be placed full depth or in lifts as site conditions dictate. The Contractor shall provide a method to plug the ends of the existing pipe in order to contain the flowable fill.

**Measurement and Payment**

At locations where flowable fill is called for on the plans and a pay item for flowable fill is included in the contract, *Flowable Fill* will be measured in cubic yards and paid as the actual number of cubic yards that have been satisfactorily placed and accepted. Such price and payment will be full compensation for all work covered by this provision including, but not limited to, the mix design, furnishing, hauling, placing and containing the flowable fill.

Payment will be made under:

<b>Pay Item</b>	<b>Pay Unit</b>
Flowable Fill	Cubic Yard

**AGGREGATE SUBGRADE:**

(5-15-18)

505

SP5 R8

Revise the *2018 Standard Specifications* as follows:

**Page 5-8, Article 505-1 DESCRIPTION, lines 4-6,** replace the paragraph with the following:

Construct aggregate subgrades in accordance with the contract. Install geotextile for soil stabilization and place Class IV subgrade stabilization at locations shown in the plans and as directed.

Undercut natural soil materials if necessary to construct aggregate subgrades. Define “subbase” as the portion of the roadbed below the Class IV subgrade stabilization. For Type 2 aggregate subgrades, undercut subbases as needed. The types of aggregate subgrade with thickness and compaction requirements for each are as shown below.

**Type 1** – A 6 to 24 inch thick aggregate subgrade with Class IV subgrade stabilization compacted to 92% of AASHTO T 180 as modified by the Department or to the highest density that can be reasonably obtained.

**Type 2** – An 8 inch thick aggregate subgrade on a proof rolled subbase with Class IV subgrade stabilization compacted to 97% of AASHTO T 180 as modified by the Department.

**Page 5-8, Article 505-3 CONSTRUCTION METHODS, line 12**, insert the following after the first sentence of the first paragraph:

For Type 2 aggregate subgrades, proof roll subbases in accordance with Section 260 before installing geotextile for soil stabilization.

**Page 5-8, Article 505-3 CONSTRUCTION METHODS, lines 16-17**, replace the last sentence of the first paragraph with the following:

Compact ABC as required for the type of aggregate subgrade constructed.

**Page 5-8, Article 505-4 MEASUREMENT AND PAYMENT, line 26**, insert the following after the last sentence of the first paragraph:

*Undercut Excavation* of natural soil materials from subbases for Type 2 aggregate subgrades will be measured and paid in accordance with Article 225-7 or 226-3. No measurement will be made for any undercut excavation of fill materials from subbases.

**PRICE ADJUSTMENT - ASPHALT BINDER FOR PLANT MIX:**

(11-21-00)

620

SP6 R25

Price adjustments for asphalt binder for plant mix will be made in accordance with Section 620 of the *2018 Standard Specifications*.

The base price index for asphalt binder for plant mix is **\$ 446.50** per ton.

This base price index represents an average of F.O.B. selling prices of asphalt binder at supplier's terminals on **April 1, 2018**.

**FINAL SURFACE TESTING NOT REQUIRED:**

(5-18-04) (Rev. 2-16-16)

610

SP6 R45

Final surface testing is not required on this project in accordance with Section 610-13, *Final Surface Testing and Acceptance*.

**ASPHALT CONCRETE PLANT MIX PAVEMENTS:**

(2-20-18)

610, 1012

SP6 R65

Revise the 2018 Standard Specifications as follows:

**Page 6-17, Table 610-1, MIXING TEMPERATURE AT THE ASPHALT PLANT**, replace with the following:

<b>TABLE 610-1</b>	
<b>MIXING TEMPERATURE AT THE ASPHALT PLANT</b>	
<b>Binder Grade</b>	<b>JMF Temperature</b>
PG 58-28; PG 64-22	250 - 290°F
PG 76-22	300 - 325°F

**Page 6-17, Subarticle 610-3(C), Job Mix Formula (JMF), lines 38-39**, delete the fourth paragraph.

**Page 6-18, Subarticle 610-3(C), Job Mix Formula (JMF), line 12**, replace “SF9.5A” with “S9.5B”.

**Page 6-18, Table 610-3, MIX DESIGN CRITERIA**, replace with the following:

<b>TABLE 610-3</b>									
<b>MIX DESIGN CRITERIA</b>									
<b>Mix Type</b>	<b>Design ESALs millions<sup>A</sup></b>	<b>Binder PG Grade<sup>B</sup></b>	<b>Compaction Levels</b>		<b>Max. Rut Depth (mm)</b>	<b>Volumetric Properties</b>			
			<b>Gmm @</b>			<b>VMA % Min.</b>	<b>VTM %</b>	<b>VFA Min.-Max.</b>	<b>%Gmm @ Nini</b>
			<b>Nini</b>	<b>Ndes</b>					
S4.75A	< 1	64 - 22	6	50	11.5	16.0	4.0 - 6.0	65 - 80	≤ 91.5
S9.5B	0 - 3	64 - 22	6	50	9.5	16.0	3.0 - 5.0	70 - 80	≤ 91.5
S9.5C	3 - 30	64 - 22	7	65	6.5	15.5	3.0 - 5.0	65 - 78	≤ 90.5
S9.5D	> 30	76 - 22	8	100	4.5	15.5	3.0 - 5.0	65 - 78	≤ 90.0
I19.0C	ALL	64 - 22	7	65	-	13.5	3.0 - 5.0	65 - 78	≤ 90.5
B25.0C	ALL	64 - 22	7	65	-	12.5	3.0 - 5.0	65 - 78	≤ 90.5
		<b>Design Parameter</b>					<b>Design Criteria</b>		
All Mix Types		Dust to Binder Ratio (P <sub>0.075</sub> / P <sub>be</sub> )					0.6 - 1.4 <sup>C</sup>		
		Tensile Strength Ratio (TSR) <sup>D</sup>					85% Min. <sup>E</sup>		

**A.** Based on 20 year design traffic.

**B.** Volumetric Properties based on specimens compacted to N<sub>des</sub> as modified by the Department.

**C.** Dust to Binder Ratio (P<sub>0.075</sub> / P<sub>be</sub>) for Type S4.75A is 1.0 - 2.0.

**D.** NCDOT-T-283 (No Freeze-Thaw cycle required).

**E.** TSR for Type S4.75A & B25.0C mixes is 80% minimum.

**Page 6-19, Table 610-5, BINDER GRADE REQUIREMENTS (BASED ON RBR%),** replace with the following:

Mix Type	%RBR ≤ 20%	21% ≤ %RBR ≤ 30%	%RBR > 30%
S4.75A, S9.5B, S9.5C, I19.0C, B25.0C	PG 64-22	PG 64-22 <sup>A</sup>	PG 58-28
S9.5D, OGFC	PG 76-22 <sup>B</sup>	n/a	n/a

**Page 6-20, Table 610-6, PLACEMENT TEMPERATURES FOR ASPHALT,** replace with the following:

TABLE 610-6 PLACEMENT TEMPERATURES FOR ASPHALT	
Asphalt Concrete Mix Type	Minimum Surface and Air Temperature
B25.0C	35°F
I19.0C	35°F
S4.75A, S9.5B, S9.5C	40°F <sup>A</sup>
S9.5D	50°F

A. If the mix contains any amount of RAS, The virgin binder shall be PG 58-28.

**Page 6-23, Table 610-7, DENSITY REQUIREMENTS,** replace with the following:

TABLE 610-7 DENSITY REQUIREMENTS	
Mix Type	Minimum % G <sub>mm</sub> (Maximum Specific Gravity)
S4.75A	85.0 <sup>A</sup>
S9.5B	90.0
S9.5C, S9.5D, I19.0C, B25.0C	92.0

A. Compaction to the above specified density will be required when the S4.75A mix is applied at a rate of 100 lbs/sy or higher.

**Page 6-32, Article 610-16 MEASUREMENT AND PAYMENT,** replace with the following:

Pay Item	Pay Unit
Asphalt Concrete Base Course, Type B25.0C	Ton
Asphalt Concrete Intermediate Course, Type I19.0C	Ton
Asphalt Concrete Surface Course, Type S4.75A	Ton
Asphalt Concrete Surface Course, Type S9.5B	Ton
Asphalt Concrete Surface Course, Type S9.5C	Ton
Asphalt Concrete Surface Course, Type S9.5D	Ton

Page 10-30, Table 1012-1, AGGREGATE CONSENSUS PROPERTIES, replace with the following:

Mix Type	Coarse Aggregate Angularity <sup>B</sup>	Fine Aggregate Angularity % Minimum	Sand Equivalent % Minimum	Flat and Elongated 5 : 1 Ratio % Maximum
<i>Test Method</i>	<i>ASTM D5821</i>	<i>AASHTO T 304</i>	<i>AASHTO T 176</i>	<i>ASTM D4791</i>
S4.75A; S9.5B	75 / -	40	40	-
S9.5C; I19.0C; B25.0C	95 / 90	45	45	10
S9.5D	100 / 100	45	50	10
OGFC	100 / 100	45	45	10
UBWC	100 / 85	45	45	10

A. Requirements apply to the design aggregate blend.

B. 95 / 90 denotes that 95% of the coarse aggregate has one fractured face and 90% has 2 or more fractured faces.

### **FIELD OFFICE (Lump Sum):**

#### **Description**

This work consists of furnishing, erecting, equipping, and maintaining a field office for the exclusive use of Department Engineers and Inspectors as well as the NSR Flagmen at a location on the project approved by the Engineer. Provide a field office that complies with the current ADA Design and Accessibility Standards, the National Electric Code, local, state, and federal regulations, and the following requirements.

#### **Procedures**

The field office and equipment will remain the property of the Contractor upon completion of the contract. The field office shall be separated from buildings and trailers used by the Contractor and shall be erected and functional as an initial operation. Failure to have the field office functional when work first begins on the project will result in withholding payment of the Contractor's monthly progress estimate. The field office shall be operational throughout the duration of the project and shall be removed upon completion and final acceptance of the project.

Provide a field office that is weatherproof, tightly floored and roofed, constructed with an air space above the ceiling for ventilation, supported above the ground, has a width of at least 10 feet, and the floor-to-ceiling height that is at least 7 feet 6 inches. Provide inside walls and a ceiling constructed of plywood, fiber board, gypsum board, or other suitable materials. Have the exterior walls, ceiling, and floor insulated.

Provide a field office with at least 600 square feet of floor space and that is equipped with the following:

<b><u>Number</u></b>	<b><u>Item</u></b>
2	Double-pedestal desk (approximately 60 by 34 inches, at least 2,000 square inches).
1	Plan and drafting table (approximately 30 by 96 inches) with adjustable stool.
1	Computer table at least 48 by 30 by 29 inches.
1	Plan rack for 24 by 36 inch drawings with 6 plan clamps.
1	Printing calculator.
2	2-drawer fire protection file, 15 inch drawer width, minimum UL rating of Class 350.
7	Office chairs with at least two chairs having casters.
3	Wastebaskets.
1	Pencil sharpener.
1	Copy machine (8 inch x 11 inch copies)
1	Telephone.
1	Fax Machine.
1	Answering machine.
1	Internet Connection Service (modem for Wi-Fi).

### **Windows and Doors**

Provide a field office with at least three windows with blinds, each having an area of at least 540 square inches, capable of being easily opened and secured from the inside and having at least two exterior passage doors. Provide doors at least 30 inches in width and 78 inches in height. Provide screens for windows and doors. Equip exterior passage doors with locks, and furnish at least two keys to the Engineer.

### **Steps**

Provide accessibility in compliance with the current ADA Design and Accessibility Standards, and the State Building Code and maintain them free from obstructions.

### **Storage Facility For Nuclear Gage**

Furnish the field office with an outside storage facility for the Department's nuclear gage. The storage facility shall not be located within 10 feet of any other structure including the field office.

### **Lighting, Heating, and Air Conditioning**

The field office shall have satisfactory lighting, electrical outlets, heating equipment, an exhaust fan, and an air conditioner connected to an operational power source. Provide at least one of the light fixtures that is a fluorescent light situated over the plan and drafting table. Furnish electrical current and fuel for heating equipment.

**Fire Extinguishers**

Furnish and maintain one fire extinguisher for each required exterior passage door. Fire extinguisher may be chemical or dry powder. UL Classification 10-B:C (minimum), suitable for Type A:B:C: fires. Mount and maintain fire extinguishers in accordance with OSHA Safety and Health Standards.

**Toilets**

Provide a toilet conforming to the requirements of the state and local boards of health or other bodies or courts having jurisdiction in the area. When separate facilities for men and women are not available, place a sign with the words "Rest Room" (with letters at least 1 inch in height) over the doorway, and provide an adequate positive locking system on the inside of the doorway. Maintain responsibility for the water and sewer connections or the installation and connection of a water well and septic tank and drain field. These facilities shall conform to all local and state permits.

**Utilities**

Except for telephone service, make necessary utility and internet connections, maintain utilities and internet connections, pay internet and utility service fees and bills, and handle final disconnection of internet and utilities. Furnish a telephone in each field office and permit the work necessary to install it.

**Storage Facility for Test Equipment**

Provide the field office with a storage facility, separate from the office for storage of test equipment, other than the nuclear gage. Provide a facility that has at least 64 square feet of floor space, is weatherproof, tightly floored and roofed, and has a tamper resistant key operated lock.

**AREMA Manual**

The Contractor shall furnish and maintain one hard-cover copy of the American Railway Engineering and Maintenance-of-Way Association (AREMA) *Manual for Railway Engineering, 2017 Edition* or latest version in the field office. In addition to use by Department Engineer and / or Inspectors, this manual will also be available for use by the Contractor or sub-contractors when Department personnel are available to provide access to the field office.

**Miscellaneous Items**

The field office shall also include the following:

1. A certification that the office is free of asbestos and other hazardous materials.
2. A broom, dust pan, mop and bucket, and general cleaning supplies.
3. Provide and maintain an all-weather parking area for six vehicles, including graveled access to the paved surface.

### Measurement and Payment

Payment at the contract lump sum bid price for *Field Office* will be full compensation for all work covered by this provision including but not limited to furnishing, erecting, maintaining, and removing the field office as outlined in this provision.

Installation and service fees for the telephone will be paid for by the Department. Payment will be made under:

<b>Pay Item</b>	<b>Pay Unit</b>
Field Office	Lump Sum

### **TEMPORARY SHORING:**

(2-20-07) (Rev. 1-16-18)

SP11 R02

### **Description**

Temporary shoring includes cantilever, braced and anchored shoring and temporary mechanically stabilized earth (MSE) walls. Temporary shoring does not include trench boxes. At the Contractor's option, use any type of temporary shoring unless noted otherwise in the plans or as directed. Design and construct temporary shoring based on actual elevations and shoring dimensions in accordance with the contract and accepted submittals. Construct temporary shoring at locations shown in the plans and as directed. Temporary shoring is required to maintain traffic when a 2:1 (H:V) slope from the top of an embankment or bottom of an excavation will intersect the existing ground line less than 5 feet from the edge of pavement of an open travelway. This provision does not apply to pipe, inlet or utility installation unless noted otherwise in the plans.

Positive protection includes concrete barrier and temporary guardrail. Provide positive protection for temporary shoring at locations shown in the plans and as directed. Positive protection is required if temporary shoring is located in the clear zone in accordance with the *AASHTO Roadside Design Guide*.

#### (A) Cantilever and Braced Shoring

Cantilever shoring consists of steel sheet piles or H-piles with timber lagging. Braced shoring consists of sheet piles or H-piles with timber lagging and bracing such as beams, plates, walers, struts, rakers, etc. Define "piles" as sheet piles or H-piles.

#### (B) Anchored Shoring

Anchored shoring consists of sheet piles with walers or H-piles with timber lagging anchored with ground or helical anchors. Driven anchors may be accepted at the discretion of the Engineer. A ground anchor consists of a grouted steel bar or multi-strand tendon with an anchorage. A helical anchor consists of a lead section with a central steel shaft and at least one helix steel plate followed by extensions with only central shafts (no helixes) and an anchorage. Anchorages consist of steel bearing plates with washers and hex nuts for bars or steel wedge plates and wedges for strands. Use a prequalified Anchored Wall Contractor to install ground anchors. Define "anchors" as ground, helical or driven anchors.



**(C) Temporary MSE Walls**

Temporary MSE walls include temporary geosynthetic and wire walls. Define “temporary wall” as a temporary MSE wall and “Temporary Wall Vendor” as the vendor supplying the temporary MSE wall. Define “reinforcement” as geotextile, geogrid, welded wire grid or metallic strip reinforcement.

Temporary geosynthetic walls consist of geotextile or geogrid reinforcement wrapped behind welded wire facing. Define “temporary geotextile wall” as a temporary geosynthetic wall with geotextile reinforcement and “temporary geogrid wall” as a temporary geosynthetic wall with geogrid reinforcement.

Temporary wire walls consist of welded wire grid or metallic strip reinforcement connected to welded wire facing. Define “Wire Wall Vendor” as the vendor supplying the temporary wire wall.

**(D) Embedment**

Define “embedment” for cantilever, braced and anchored shoring as the pile depth below the grade in front of shoring. Define “embedment” for temporary walls as the wall height below the grade in front of walls.

**(E) Positive Protection**

Define “unanchored or anchored portable concrete barrier” as portable concrete barrier (PCB) that meets 2018 Roadway Standard Drawing No. 1170.01. Define “concrete barrier” as unanchored or anchored PCB or an approved equal. Define “temporary guardrail” as temporary steel beam guardrail that meets 2018 Roadway Standard Drawing No. 862.02.

**Materials**

Refer to the *2018 Standard Specifications*.

<b>Item</b>	<b>Section</b>
Concrete Barrier Materials	1170-2
Flowable Fill, Excavatable	1000-6
Geosynthetics	1056
Neat Cement Grout	1003
Portland Cement Concrete	1000
Select Materials	1016
Steel Beam Guardrail Materials	862-2
Steel Plates	1072-2
Steel Sheet Piles and H-Piles	1084
Untreated Timber	1082-2
Welded Wire Reinforcement	1070-3

Provide Type 6 material certifications for shoring materials in accordance with Article 106-3 of the *2018 Standard Specifications*. Use Class IV select material for temporary guardrail. Use neat cement grout for Type 2 grout for ground anchors. Use Class A concrete that meets Article 450-2 of the *2018 Standard Specifications* or Type 1 grout for drilled-in piles. Provide untreated timber with a thickness of at least 3 inches and a bending stress of at least 1,000 pounds per square inch for timber lagging. Provide steel bracing that meets ASTM A36.

(A) Shoring Backfill

Use Class II, Type 1, Class III, Class V or Class VI select material or material that meets AASHTO M 145 for soil classification A-2-4 with a maximum PI of 6 for shoring backfill except do not use A-2-4 soil for backfill around culverts.

(B) Anchors

Store anchor materials on blocking a minimum of 12 inches above the ground and protect it at all times from damage; and when placing in the work make sure it is free from dirt, dust, loose mill scale, loose rust, paint, oil or other foreign materials. Load, transport, unload and store anchor materials so materials are kept clean and free of damage. Bent, damaged or defective materials will be rejected.

(1) Ground Anchors

Use high-strength deformed steel bars that meet AASHTO M 275 or seven-wire strands that meet ASTM A886 or Article 1070-5 of the *2018 Standard Specifications*. Splice bars in accordance with Article 1070-9 of the *2018 Standard Specifications*. Do not splice strands. Use bondbreakers, spacers and centralizers that meet Article 6.3.5 of the *AASHTO LRFD Bridge Construction Specifications*.

(2) Helical Anchors

Use helical anchors with an ICC Evaluation Service, Inc. (ICC-ES) report. Provide couplers, thread bar adapters and bolts recommended by the Anchor Manufacturer to connect helical anchors together and to piles.

(3) Anchorages

Provide steel plates for bearing plates and steel washers, hex nuts, wedge plates and wedges recommended by the Anchor Manufacturer.

(C) Temporary Walls

(1) Welded Wire Facing

Use welded wire reinforcement for welded wire facing, struts and wires. For temporary wire walls, provide welded wire facing supplied by the Wire Wall Vendor or a manufacturer approved or licensed by the vendor. For temporary wire walls with separate reinforcement and facing components, provide connectors (e.g.,

bars, clamps, plates, etc.) and fasteners (e.g., bolts, nuts, washers, etc.) required by the Wire Wall Vendor.

(2) Geotextiles

Provide Type 2 geotextile for separation and retention geotextiles. Provide Type 5 geotextile for geotextile reinforcement with ultimate tensile strengths in accordance with the accepted submittals.

(3) Geogrid Reinforcement

Use geogrids with a roll width of at least 4 feet and an “approved” or “approved for provisional use” status code. The list of approved geogrids is available from: [connect.ncdot.gov/resources/Materials/Pages/Materials-Manual-by-Material.aspx](http://connect.ncdot.gov/resources/Materials/Pages/Materials-Manual-by-Material.aspx)

Provide geogrids for geogrid reinforcement with design strengths in accordance with the accepted submittals. Geogrids are typically approved for ultimate tensile strengths in the machine direction (MD) and cross-machine direction (CD) or short-term design strengths for a 3-year design life in the MD based on material type. Define material type from the website above for shoring backfill as follows:

<b>Material Type</b>	<b>Shoring Backfill</b>
Borrow	A-2-4 Soil
Fine Aggregate	Class II, Type 1 or Class III Select Material
Coarse Aggregate	Class V or VI Select Material

(4) Welded Wire Grid and Metallic Strip Reinforcement

Provide welded wire grid and metallic strip reinforcement supplied by the Wire Wall Vendor or a manufacturer approved or licensed by the vendor. Use welded wire grid reinforcement (“mesh”, “mats” and “ladders”) that meet Article 1070-3 of the *2018 Standard Specifications* and metallic strip reinforcement (“straps”) that meet ASTM A572 or A1011.

### **Preconstruction Requirements**

(A) Concrete Barrier

Define “clear distance” behind concrete barrier as the horizontal distance between the barrier and edge of pavement. The minimum required clear distance for concrete barrier is shown in the plans. At the Contractor’s option or if the minimum required clear distance is not available, set concrete barrier next to and up against traffic side of temporary shoring except for barrier above temporary walls. Concrete barrier with the minimum required clear distance is required above temporary walls.

## (B) Temporary Guardrail

Define “clear distance” behind temporary guardrail as the horizontal distance between guardrail posts and temporary shoring. At the Contractor’s option or if clear distance for cantilever, braced and anchored shoring is less than 4 feet, attach guardrail to traffic side of shoring as shown in the plans. Place ABC in clear distance and around guardrail posts instead of pavement. Do not use temporary guardrail above temporary walls.

## (C) Temporary Shoring Designs

Before beginning temporary shoring design, survey existing ground elevations in the vicinity of shoring locations to determine actual design heights (H). Submit PDF files of working drawings and design calculations for temporary shoring designs in accordance with Article 105-2 of the *2018 Standard Specifications*. Submit working drawings showing plan views, shoring profiles, typical sections and details of temporary shoring design and construction sequence. Do not begin shoring construction until a design submittal is accepted.

Have cantilever and braced shoring designed, detailed and sealed by an engineer licensed in the state of North Carolina. Use a prequalified Anchored Wall Design Consultant to design anchored shoring. Provide anchored shoring designs sealed by a Design Engineer approved as a Geotechnical Engineer (key person) for an Anchored Wall Design Consultant. Include details in anchored shoring working drawings of anchor locations and lock-off loads, unit grout/ground bond strengths for ground anchors or minimum installation torque and torsional strength rating for helical anchors and if necessary, obstructions extending through shoring or interfering with anchors. Include details in the anchored shoring construction sequence of pile and anchor installation, excavation and anchor testing.

Provide temporary wall designs sealed by a Design Engineer licensed in the state of North Carolina and employed or contracted by the Temporary Wall Vendor. Include details in temporary wall working drawings of geotextile and reinforcement types, locations and directions and obstructions extending through walls or interfering with reinforcement.

## (1) Soil Parameters

Design temporary shoring for the assumed soil parameters and groundwater elevations shown in the plans. Assume the following soil parameters for shoring backfill:

(a) Unit weight ( $\gamma$ ) = 120 pcf;

(b)	Friction Angle ( $\phi$ )	Shoring Backfill
	30°	A-2-4 Soil
	34°	Class II, Type 1 or Class III Select Material
	38°	Class V or VI Select Material

(c) Cohesion (c) = 0 psf.

(2) Traffic Surcharge

Design temporary shoring for a traffic surcharge of 250 pounds per square foot if traffic will be above and within H of shoring. This traffic surcharge does not apply to construction traffic. Design temporary shoring for any construction surcharge if construction traffic will be above and within H of shoring. For LRFD shoring designs, apply traffic (live load) surcharge in accordance with Figure C11.5.5-3 of the *AASHTO LRFD Bridge Design Specifications*.

(3) Cantilever, Braced and Anchored Shoring Designs

Use shoring backfill for fill sections and voids between cantilever, braced and anchored shoring and the critical failure surface. Use concrete or grout for embedded portions of drilled-in H-piles. Do not use drilled-in sheet piles.

Define “top of shoring” for cantilever, braced and anchored shoring as where the grade intersects the back of sheet piles or H-piles and timber lagging. Design cantilever, braced and anchored shoring for a traffic impact load of 2,000 pounds per foot applied 18 inches above top of shoring if concrete barrier is above and next to shoring or temporary guardrail is above and attached to shoring. For anchored shoring designs, apply traffic impact load as horizontal load ( $P_{HI}$ ) in accordance with Figure 3.11.6.3-2(a) of the *AASHTO LRFD specifications*.

Extend cantilever, braced and anchored shoring at least 32 inches above top of shoring if shoring is designed for traffic impact. Otherwise, extend shoring at least 6 inches above top of shoring.

Design cantilever, braced and anchored shoring for a maximum deflection of 3 inches if the horizontal distance to the closest edge of pavement or structure is less than H. Otherwise, design shoring for a maximum deflection of 6 inches. Design cantilever and braced shoring in accordance with the plans and *AASHTO Guide Design Specifications for Bridge Temporary Works*.

Design anchored shoring in accordance with the plans and Article 11.9 of the *AASHTO LRFD Bridge Design Specifications*. Use a resistance factor of 0.80 for tensile resistance of anchors with bars, strands or shafts. Extend the unbonded length for ground anchors and the shallowest helix for helical anchors at least 5 feet behind the critical failure surface. Do not extend anchors beyond right-of-way or easement limits. If existing or future obstructions such as foundations, guardrail posts, pavements, pipes, inlets or utilities will interfere with anchors, maintain a clearance of at least 6 inches between obstructions and anchors.

(4) Temporary Wall Designs

Use shoring backfill in the reinforced zone of temporary walls. Separation geotextiles are required between shoring backfill and backfill, natural ground or culverts along the sides of the reinforced zone perpendicular to the wall face. For Class V or VI select material in the reinforced zone, separation geotextiles are also

required between shoring backfill and backfill or natural ground on top of and at the back of the reinforced zone.

Design temporary walls in accordance with the plans and Article 11.10 of the *AASHTO LRFD Bridge Design Specifications*. Embed temporary walls at least 18 inches except for walls on structures or rock as determined by the Engineer. Use a uniform reinforcement length throughout the wall height of at least 0.7H or 6 feet, whichever is longer. Extend the reinforced zone at least 6 inches beyond end of reinforcement. Do not locate the reinforced zone outside right-of-way or easement limits.

Use the simplified method for determining maximum reinforcement loads in accordance with the AASHTO LRFD specifications. For geotextile reinforcement, use geotextile properties approved by the Department or default values in accordance with the AASHTO LRFD specifications. For geogrid reinforcement, use approved geogrid properties available from the website shown elsewhere in this provision. If the website does not list a short-term design strength for an approved geogrid, use a short-term design strength equal to the ultimate tensile strength divided by 3.5 for the geogrid reinforcement. Use geosynthetic properties for the direction reinforcement will be installed, a 3-year design life and shoring backfill to be used in the reinforced zone.

Do not use more than 4 different reinforcement strengths for each temporary geosynthetic wall. Design temporary geotextile walls for a reinforcement coverage ratio ( $R_c$ ) of 1.0. For temporary geogrid walls with an  $R_c$  of less than 1.0, use a maximum horizontal clearance between geogrids of 3 feet and stagger reinforcement so geogrids are centered over gaps in the reinforcement layer below.

For temporary geosynthetic walls, use “L” shaped welded wire facing with 18 to 24 inch long legs. Locate geotextile or geogrid reinforcement so reinforcement layers are at the same level as the horizontal legs of welded wire facing. Use vertical reinforcement spacing equal to facing height. Wrap geotextile or geogrid reinforcement behind welded wire facing and extend reinforcement at least 3 feet back behind facing into shoring backfill.

For temporary wire walls with separate reinforcement and facing components, attach welded wire grid or metallic strip reinforcement to welded wire facing with a connection approved by the Department. For temporary geogrid and wire walls, retain shoring backfill at welded wire facing with retention geotextiles and extend geotextiles at least 3 feet back behind facing into backfill.

(D) Preconstruction Meeting

The Engineer may require a shoring preconstruction meeting to discuss the construction, inspection and testing of the temporary shoring. If required and if this meeting occurs before all shoring submittals have been accepted, additional preconstruction meetings may be required before beginning construction of temporary shoring without accepted submittals. The Resident, District or Bridge Maintenance Engineer, Area Construction

Engineer, Geotechnical Operations Engineer, Contractor and Shoring Contractor Superintendent will attend preconstruction meetings.

### **Construction Methods**

Control drainage during construction in the vicinity of shoring. Direct run off away from shoring and shoring backfill. Contain and maintain backfill and protect material from erosion.

Install positive protection in accordance with the contract and accepted submittals. Use PCB in accordance with Section 1170 of the *2018 Standard Specifications* and 2018 Roadway Standard Drawing No. 1170.01. Use temporary guardrail in accordance with Section 862 of the *2018 Standard Specifications* and 2018 Roadway Standard Drawing Nos. 862.01, 862.02 and 862.03.

#### **(A) Tolerances**

Construct shoring with the following tolerances:

- (1) Horizontal wires of welded wire facing are level in all directions,
- (2) Shoring location is within 6 inches of horizontal and vertical alignment shown in the accepted submittals, and
- (3) Shoring plumbness (batter) is not negative and within 2 degrees of vertical.

#### **(B) Cantilever, Braced and Anchored Shoring Installation**

If overexcavation behind cantilever, braced or anchored shoring is shown in the accepted submittals, excavate before installing piles. Otherwise, install piles before excavating for shoring. Install cantilever, braced or anchored shoring in accordance with the construction sequence shown in the accepted submittals. Remove piles and if applicable, timber lagging when shoring is no longer needed.

##### **(1) Pile Installation**

Install piles with the minimum required embedment and extension in accordance with Subarticles 450-3(D) and 450-3(E) of the *2018 Standard Specifications* except that a pile driving equipment data form is not required. Piles may be installed with a vibratory hammer as approved by the Engineer.

Do not splice sheet piles. Use pile excavation to install drilled-in H-piles. After filling holes with concrete or grout to the elevations shown in the accepted submittals, remove any fluids and fill remaining portions of holes with flowable fill. Cure concrete or grout at least 7 days before excavating.

Notify the Engineer if refusal is reached before pile excavation or driven piles attain the minimum required embedment. When this occurs, a revised design submittal may be required.

## (2) Excavation

Excavate in front of piles from the top down in accordance with the accepted submittals. For H-piles with timber lagging and braced and anchored shoring, excavate in staged horizontal lifts with a maximum height of 5 feet. Remove flowable fill and material in between H-piles as needed to install timber lagging. Position lagging with at least 3 inches of contact in the horizontal direction between the lagging and pile flanges. Do not excavate the next lift until timber lagging for the current lift is installed and if applicable, bracing and anchors for the current lift are accepted. Backfill behind cantilever, braced or anchored shoring with shoring backfill.

## (3) Anchor Installation

If applicable, install foundations located behind anchored shoring before installing anchors. Fabricate and install ground anchors in accordance with the accepted submittals, Articles 6.4 and 6.5 of the *AASHTO LRFD Bridge Construction Specifications* and the following unless otherwise approved:

- (a) Materials in accordance with this provision are required instead of materials conforming to Articles 6.4 and 6.5.3 of the *AASHTO LRFD Specifications*,
- (b) Encapsulation-protected ground anchors in accordance with Article 6.4.1.2 of the *AASHTO LRFD specifications* are not required, and
- (c) Corrosion protection for unbonded lengths of ground anchors and anchorage covers are not required.
- (d) Measure grout temperature, density and flow during grouting with at least the same frequency grout cubes are made for compressive strength. Perform density and flow field tests in the presence of the Engineer in accordance with American National Standards Institute/American Petroleum Institute Recommended Practice 13B-1 (Section 4, Mud Balance) and ASTM C939 (Flow Cone), respectively.

Install helical anchors in accordance with the accepted submittals and Anchor Manufacturer's instructions. Measure torque during installation and do not exceed the torsional strength rating of the helical anchor. Attain the minimum required installation torque and penetration before terminating anchor installation. When replacing a helical anchor, embed last helix of the replacement anchor at least 3 helix plate diameters past the location of the first helix of the previous anchor.

## (4) Anchor Testing

Proof test and lock-off anchors in accordance with the accepted submittals and Article 6.5.5 of the *AASHTO LRFD Bridge Construction Specifications* except for the acceptance criteria in Article 6.5.5.5. For the *AASHTO LRFD specifications*,



“ground anchor” refers to a ground or helical anchor and “tendon” refers to a bar, strand or shaft.

(a) Anchor Acceptance

Anchor acceptance is based in part on the following criteria.

- (i) For ground and helical anchors, total movement is less than 0.04 inches between the 1 and 10 minute readings or less than 0.08 inches between the 6 and 60 minute readings.
- (ii) For ground anchors, total movement at maximum test load exceeds 80% of the theoretical elastic elongation of the unbonded length.

(b) Anchor Test Results

Submit PDF files of anchor test records including movement versus load plots for each load increment within 24 hours of completing each row of anchors. The Engineer will review the test records to determine if the anchors are acceptable.

If the Engineer determines an anchor is unacceptable, revise the anchor design or installation methods. Submit a revised anchored shoring design for acceptance and provide an acceptable anchor with the revised design or installation methods. If required, replace the anchor or provide additional anchors with the revised design or installation methods.

(C) Temporary Wall Installation

Excavate as necessary for temporary walls in accordance with the plans and accepted submittals. If applicable, install foundations located in the reinforced zone before placing shoring backfill or reinforcement unless otherwise approved. Notify the Engineer when foundation excavation is complete. Do not place shoring backfill or reinforcement until excavation dimensions and foundation material are approved.

Erect welded wire facing so the wall position is as shown in the plans and accepted submittals. Set welded wire facing adjacent to each other in the horizontal and vertical direction to completely cover the wall face with facing. Stagger welded wire facing to create a running bond by centering facing over joints in the row below.

Wrap geotextile reinforcement and retention geotextiles behind welded wire facing as shown in the plans and accepted submittals and cover geotextiles with at least 3" of shoring backfill. Overlap adjacent geotextile reinforcement and retention and separation geotextiles at least 18 inches with seams oriented perpendicular to the wall face. Hold geotextiles in place with wire staples or anchor pins as needed.

Place reinforcement within 3 inches of locations shown in the plans and accepted submittals. Before placing shoring backfill, pull reinforcement taut so it is in tension and free of kinks, folds, wrinkles or creases. Install reinforcement with the direction shown in

the plans and accepted submittals. For temporary wire walls with separate reinforcement and facing components, attach welded wire grid or metallic strip reinforcement to welded wire facing as shown in the accepted submittals. Do not splice or overlap reinforcement so seams are parallel to the wall face. Contact the Engineer when unanticipated existing or future obstructions such as foundations, pavements, pipes, inlets or utilities will interfere with reinforcement.

Place shoring backfill in the reinforced zone in 8 to 10 inch thick lifts. Compact A-2-4 soil and Class II, Type 1 and Class III select material in accordance with Subarticle 235-3(C) of the *2018 Standard Specifications*. Use only hand operated compaction equipment to compact backfill within 3 feet of welded wire facing. At a distance greater than 3 feet, compact shoring backfill with at least 4 passes of an 8 to 10 ton vibratory roller in a direction parallel to the wall face. Smooth wheeled or rubber tired rollers are also acceptable for compacting backfill. Do not use sheepsfoot, grid rollers or other types of compaction equipment with feet. Do not displace or damage reinforcement when placing and compacting shoring backfill. End dumping directly on geotextile or geogrid reinforcement is not permitted. Do not operate heavy equipment on reinforcement until it is covered with at least 8 inches of shoring backfill. Replace any damaged reinforcement to the satisfaction of the Engineer.

Backfill for temporary walls outside the reinforced zone in accordance with Article 410-8 of the *2018 Standard Specifications*. Bench temporary walls into the sides of excavations where applicable. For temporary geosynthetic walls with top of wall within 5 feet of finished grade, remove top facing and incorporate top reinforcement layer into fill when placing fill in front of wall. Temporary walls remain in place permanently unless otherwise required.

### **Measurement and Payment**

*Temporary Shoring* will be measured and paid in square feet. Temporary walls will be measured as the square feet of exposed wall face area. Cantilever, braced or anchored shoring will be measured as the square feet of exposed shoring face area with the shoring height equal to the difference between the top and bottom of shoring elevations. Define “top of shoring” as where the grade intersects the back of sheet piles or H-piles and timber lagging. Define “bottom of shoring” as where the grade intersects front of sheet piles or H-piles and timber lagging. No measurement will be made for any embedment, shoring extension above top of shoring or pavement thickness above temporary walls.

The contract unit price for *Temporary Shoring* will be full compensation for providing shoring designs, submittals and materials, excavating, backfilling, hauling and removing excavated materials and supplying all labor, tools, equipment and incidentals necessary to construct temporary shoring.

No payment will be made for temporary shoring not shown in the plans or required by the Engineer including shoring for OSHA reasons or the Contractor’s convenience. No value engineering proposals will be accepted based solely on revising or eliminating shoring locations shown in the plans or estimated quantities shown in the bid item sheets as a result of actual field measurements or site conditions.

PCB will be measured and paid in accordance with Section 1170 of the *2018 Standard Specifications*. No additional payment will be made for anchoring PCB for temporary shoring. Costs for anchoring PCB will be incidental to temporary shoring.

Temporary guardrail will be measured and paid for in accordance with Section 862 of the *2018 Standard Specifications*.

Payment will be made under:

**Pay Item**

Temporary Shoring

**Pay Unit**

Square Foot

**SUPPLEMENTAL CONTRACTOR EROSION CONTROL RESPONSIBILITIES:**

(2-19-13)

SPI G182

The Contractor shall be required to install and maintain erosion control devices and provide temporary and eventual permanent stabilization to disturbed areas until the final completion of the project contract as directed. In addition, the Contractor shall adhere to the requirements of the Erosion and Sediment Control/Stormwater Certification provided elsewhere in this contract until completion of the project. After the Contractor has completed the grading work and while Norfolk Southern's crews are installing the new track, the Contractor shall maintain erosion control responsibilities and work will continue to be required and not limited to, monitoring erosion control devices on a weekly basis after each rainfall that equals or exceeds 0.5 inches, NPDES documentation, installation and maintenance of additional erosion control devices, providing temporary groundcover, and establishment of permanent vegetation on disturbed slopes.

**SUPPLEMENTAL RESPONSE FOR EROSION CONTROL:**

(2-19-13)

SPI G183

**Description**

Furnish the labor, materials, tools and equipment necessary to move personnel, equipment, and supplies to the project necessary for the pursuit of any or all of the erosion control responsibilities of the Contractor. This provision will only be applicable after the Contractor has completed all of his work, with the exception of maintenance and removal of erosion control, and has demobilized his work force while waiting for NSR to complete track construction. Payment will only be made for occurrences where the contractor mobilizes men and equipment to perform necessary erosion control measures as required by the Department's Engineer.

**Construction Methods**

Contractor shall perform an erosion control action as described in, but not limited to, the NPDES Inspection Form SPPP30. Each erosion control action may include one or more of the work items on the form, or a separate action that is the primary responsibility of the Contractor.

**Measurement and Payment**

*Supplemental Response for Erosion Control* will be measured and paid for by counting the actual

number of times the Contractor moves onto the project, including borrow and waste sites, and satisfactorily completes and erosion control action described in Form 1675. The previous of Article 104-5 of the *Standard Specifications* will not apply to this item of work.

Payment will be made under:

**Pay Item**  
Supplemental Response for Erosion Control

**Pay Unit**  
Each

**STANDARD SPECIAL PROVISION**  
**AVAILABILITY OF FUNDS – TERMINATION OF CONTRACTS**

(5-20-08)

Z-2

*General Statute 143C-6-11. (h) Highway Appropriation* is hereby incorporated verbatim in this contract as follows:

(h) Amounts Encumbered. – Transportation project appropriations may be encumbered in the amount of allotments made to the Department of Transportation by the Director for the estimated payments for transportation project contract work to be performed in the appropriation fiscal year. The allotments shall be multiyear allotments and shall be based on estimated revenues and shall be subject to the maximum contract authority contained in *General Statute 143C-6-11(c)*. Payment for transportation project work performed pursuant to contract in any fiscal year other than the current fiscal year is subject to appropriations by the General Assembly. Transportation project contracts shall contain a schedule of estimated completion progress, and any acceleration of this progress shall be subject to the approval of the Department of Transportation provided funds are available. The State reserves the right to terminate or suspend any transportation project contract, and any transportation project contract shall be so terminated or suspended if funds will not be available for payment of the work to be performed during that fiscal year pursuant to the contract. In the event of termination of any contract, the contractor shall be given a written notice of termination at least 60 days before completion of scheduled work for which funds are available. In the event of termination, the contractor shall be paid for the work already performed in accordance with the contract specifications.

Payment will be made on any contract terminated pursuant to the special provision in accordance with Subarticle 108-13(D) of the *2018 Standard Specifications*.

**STANDARD SPECIAL PROVISION**  
**NCDOT GENERAL SEED SPECIFICATION FOR SEED QUALITY**

(5-17-11)

Z-3

Seed shall be sampled and tested by the North Carolina Department of Agriculture and Consumer Services, Seed Testing Laboratory. When said samples are collected, the vendor shall supply an independent laboratory report for each lot to be tested. Results from seed so sampled shall be final. Seed not meeting the specifications shall be rejected by the Department of Transportation and shall not be delivered to North Carolina Department of Transportation warehouses. If seed has been delivered it shall be available for pickup and replacement at the supplier's expense.

Any re-labeling required by the North Carolina Department of Agriculture and Consumer Services, Seed Testing Laboratory, that would cause the label to reflect as otherwise specified herein shall be rejected by the North Carolina Department of Transportation.

Seed shall be free from seeds of the noxious weeds Johnsongrass, Balloonvine, Jimsonweed, Witchweed, Itchgrass, Serrated Tussock, Showy Crotalaria, Smooth Crotalaria, Sicklepod, Sandbur, Wild Onion, and Wild Garlic. Seed shall not be labeled with the above weed species on the seed analysis label. Tolerances as applied by the Association of Official Seed Analysts will NOT be allowed for the above noxious weeds except for Wild Onion and Wild Garlic.

Tolerances established by the Association of Official Seed Analysts will generally be recognized. However, for the purpose of figuring pure live seed, the found pure seed and found germination percentages as reported by the North Carolina Department of Agriculture and Consumer Services, Seed Testing Laboratory will be used. Allowances, as established by the NCDOT, will be recognized for minimum pure live seed as listed on the following pages.

The specifications for restricted noxious weed seed refers to the number per pound as follows:

<b><u>Restricted Noxious Weed</u></b>	<b><u>Limitations per Lb. Of Seed</u></b>	<b><u>Restricted Noxious Weed</u></b>	<b><u>Limitations per Lb. of Seed</u></b>
Blessed Thistle	4 seeds	Cornflower (Ragged Robin)	27 seeds
Cocklebur	4 seeds	Texas Panicum	27 seeds
Spurred Anoda	4 seeds	Bracted Plantain	54 seeds
Velvetleaf	4 seeds	Buckhorn Plantain	54 seeds
Morning-glory	8 seeds	Broadleaf Dock	54 seeds
Corn Cockle	10 seeds	Curly Dock	54 seeds
Wild Radish	12 seeds	Dodder	54 seeds
Purple Nutsedge	27 seeds	Giant Foxtail	54 seeds
Yellow Nutsedge	27 seeds	Horsenettle	54 seeds
Canada Thistle	27 seeds	Quackgrass	54 seeds
Field Bindweed	27 seeds	Wild Mustard	54 seeds
Hedge Bindweed	27 seeds		

Seed of Pensacola Bahiagrass shall not contain more than 7% inert matter, Kentucky Bluegrass, Centipede and Fine or Hard Fescue shall not contain more than 5% inert matter whereas a maximum of 2% inert matter will be allowed on all other kinds of seed. In addition, all seed shall

not contain more than 2% other crop seed nor more than 1% total weed seed. The germination rate as tested by the North Carolina Department of Agriculture shall not fall below 70%, which includes both dormant and hard seed. Seed shall be labeled with not more than 7%, 5% or 2% inert matter (according to above specifications), 2% other crop seed and 1% total weed seed.

Exceptions may be made for minimum pure live seed allowances when cases of seed variety shortages are verified. Pure live seed percentages will be applied in a verified shortage situation. Those purchase orders of deficient seed lots will be credited with the percentage that the seed is deficient.

**FURTHER SPECIFICATIONS FOR EACH SEED GROUP ARE GIVEN BELOW:**

Minimum 85% pure live seed; maximum 1% total weed seed; maximum 2% total other crop seed; maximum 144 restricted noxious weed seed per pound. Seed less than 83% pure live seed will not be approved.

Sericea Lespedeza  
Oats (seeds)

Minimum 80% pure live seed; maximum 1% total weed seed; maximum 2% total other crop; maximum 144 restricted noxious weed seed per pound. Seed less than 78% pure live seed will not be approved.

Tall Fescue (all approved varieties)	Bermudagrass
Kobe Lespedeza	Browntop Millet
Korean Lespedeza	German Millet – Strain R
Weeping Lovegrass	Clover – Red/White/Crimson
Carpetgrass	

Minimum 78% pure live seed; maximum 1% total weed seed; maximum 2% total other crop seed; maximum 144 restricted noxious weed seed per pound. Seed less than 76% pure live seed will not be approved.

Common or Sweet Sundangrass

Minimum 76% pure live seed; maximum 1% total weed seed; maximum 2% total other crop seed; maximum 144 restricted noxious weed seed per pound. Seed less than 74% pure live seed will not be approved.

Rye (grain; all varieties)  
Kentucky Bluegrass (all approved varieties)  
Hard Fescue (all approved varieties)  
Shrub (bicolor) Lespedeza

Minimum 70% pure live seed; maximum 1% total weed seed; maximum 2% total other crop seed; maximum 144 noxious weed seed per pound. Seed less than 70% pure live seed will not be approved.

Centipedegrass	Japanese Millet
Crownvetch	Reed Canary Grass
Pensacola Bahiagrass	Zoysia
Creeping Red Fescue	

Minimum 70% pure live seed; maximum 1% total weed seed; maximum 2% total other crop seed; maximum 5% inert matter; maximum 144 restricted noxious weed seed per pound.

Barnyard Grass  
Big Bluestem  
Little Bluestem  
Bristly Locust  
Birdsfoot Trefoil  
Indiangrass  
Orchardgrass  
Switchgrass  
Yellow Blossom Sweet Clover



**STANDARD SPECIAL PROVISION**

**ERRATA**

(2-12-18)

Z-4

Revise the *2018 Standard Specifications* as follows:

**Division 7**

**Page 7-27, line 4, Article 725-1 MEASUREMENT AND PAYMENT**, replace article number “725-1” with “724-4”.

**Page 7-28, line 10, Article 725-1 MEASUREMENT AND PAYMENT**, replace article number “725-1” with “725-3”.

**Division 10**

**Page 10-162, line 1, Article 1080-50 PAINT FOR VERTICAL MARKERS**, replace article number “1080-50” with “1080-10”.

**Page 10-162, line 5, Article 1080-61 EPOXY RESIN FOR REINFORCING STEEL**, replace article number “1080-61” with “1080-11”.

**Page 10-162, line 22, Article 1080-72 ABRASIVE MATERIALS FOR BLAST CLEANING STEEL**, replace article number “1080-72” with “1080-12”.

**Page 10-163, line 25, Article 1080-83 FIELD PERFORMANCE AND SERVICES**, replace article number “1080-83” with “1080-13”.

**STANDARD SPECIAL PROVISION****PLANT AND PEST QUARANTINES****(Imported Fire Ant, Gypsy Moth, Witchweed, Emerald Ash Borer, And Other Noxious Weeds)**

(3-18-03) (Rev. 12-20-16)

Z-04a

**Within Quarantined Area**

This project may be within a county regulated for plant and/or pests. If the project or any part of the Contractor's operations is located within a quarantined area, thoroughly clean all equipment prior to moving out of the quarantined area. Comply with federal/state regulations by obtaining a certificate or limited permit for any regulated article moving from the quarantined area.

**Originating in a Quarantined County**

Obtain a certificate or limited permit issued by the N.C. Department of Agriculture/United States Department of Agriculture. Have the certificate or limited permit accompany the article when it arrives at the project site.

**Contact**

Contact the N.C. Department of Agriculture/United States Department of Agriculture at 1-800-206-9333, 919-707-3730, or <http://www.ncagr.gov/plantindustry/> to determine those specific project sites located in the quarantined area or for any regulated article used on this project originating in a quarantined county.

**Regulated Articles Include**

1. Soil, sand, gravel, compost, peat, humus, muck, and decomposed manure, separately or with other articles. This includes movement of articles listed above that may be associated with cut/waste, ditch pulling, and shoulder cutting.
2. Plants with roots including grass sod.
3. Plant crowns and roots.
4. Bulbs, corms, rhizomes, and tubers of ornamental plants.
5. Hay, straw, fodder, and plant litter of any kind.
6. Clearing and grubbing debris.
7. Used agricultural cultivating and harvesting equipment.
8. Used earth-moving equipment.
9. Any other products, articles, or means of conveyance, of any character, if determined by an inspector to present a hazard of spreading imported fire ant, gypsy moth, witchweed, emerald ash borer, or other noxious weeds.

**STANDARD SPECIAL PROVISION****MINORITY AND FEMALE EMPLOYMENT REQUIREMENTS**

Z-7

**NOTICE OF REQUIREMENTS FOR AFFIRMATIVE ACTION TO ENSURE EQUAL EMPLOYMENT OPPORTUNITY (*EXECUTIVE NUMBER 11246*)**

1. The goals and timetables for minority and female participation, expressed in percentage terms for the Contractor's aggregate workforce in each trade on all construction work in the covered area, see as shown on the attached sheet entitled "Employment Goals for Minority and Female participation".

These goals are applicable to all the Contractor's construction work (whether or not it is Federal or federally assisted) performed in the covered area. If the Contractor performs construction work in a geographical area located outside of the covered area, it shall apply the goals established for such geographical area where the work is actually performed. With regard to this second area, the Contractor also is subject to the goals for both its federally involved and nonfederally involved construction.

The Contractor's compliance with the Executive Order and the regulations in *41 CFR Part 60-4* shall be based on its implementation of the Equal Opportunity Clause, specific affirmative action obligations required by the specifications set forth in *41 CFR 60-4.3(a)*, and its effort to meet the goals. The hours of minority and female employment and training must be substantially uniform throughout the length of the contract, and in each trade and the Contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from Contractor to Contractor or from project to project for the sole purpose of meeting the Contractor's goals shall be a violation of the contract, the executive Order and the regulations in *41 CFR Part 60-4*. Compliance with the goals will be measured against the total work hours performed.

2. As used in this Notice and in the contract resulting from this solicitation, the "covered area" is the county or counties shown on the cover sheet of the proposal form and contract.

**EMPLOYMENT GOALS FOR MINORITY  
AND FEMALE PARTICIPATION**

Economic Areas

**Area 023 29.7%**

Bertie County  
Camden County  
Chowan County  
Gates County  
Hertford County  
Pasquotank County  
Perquimans County

**Area 024 31.7%**

Beaufort County  
Carteret County  
Craven County  
Dare County  
Edgecombe County  
Green County  
Halifax County  
Hyde County  
Jones County  
Lenoir County  
Martin County  
Nash County  
Northampton County  
Pamlico County  
Pitt County  
Tyrrell County  
Washington County  
Wayne County  
Wilson County

**Area 025 23.5%**

Columbus County  
Duplin County  
Onslow County  
Pender County

**Area 026 33.5%**

Bladen County  
Hoke County  
Richmond County  
Robeson County  
Sampson County  
Scotland County

**Area 027 24.7%**

Chatham County  
Franklin County  
Granville County  
Harnett County  
Johnston County  
Lee County  
Person County  
Vance County  
Warren County

**Area 028 15.5%**

Alleghany County  
Ashe County  
Caswell County  
Davie County  
Montgomery County  
Moore County  
Rockingham County  
Surry County  
Watauga County  
Wilkes County

**Area 029 15.7%**

Alexander County  
Anson County  
Burke County  
Cabarrus County  
Caldwell County  
Catawba County  
Cleveland County  
Iredell County  
Lincoln County  
Polk County  
Rowan County  
Rutherford County  
Stanly County

**Area 0480 8.5%**

Buncombe County  
Madison County

**Area 030 6.3%**

Avery County  
Cherokee County  
Clay County  
Graham County  
Haywood County  
Henderson County  
Jackson County  
McDowell County  
Macon County  
Mitchell County  
Swain County  
Transylvania County  
Yancey County

**SMSA Areas**

**Area 5720 26.6%**

Currituck County

**Area 9200 20.7%**

Brunswick County

New Hanover County

**Area 2560 24.2%**

Cumberland County

**Area 6640 22.8%**

Durham County

Orange County

Wake County

**Area 1300 16.2%**

Alamance County

**Area 3120 16.4%**

Davidson County

Forsyth County

Guilford County

Randolph County

Stokes County

Yadkin County

**Area 1520 18.3%**

Gaston County

Mecklenburg County

Union County

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**Goals for Female**

**Participation in Each Trade**

(Statewide) 6.9%

**STANDARD SPECIAL PROVISION****REQUIRED CONTRACT PROVISIONS FEDERAL - AID CONSTRUCTION CONTRACTS**

FHWA - 1273 Electronic Version - May 1, 2012

Z-8

- I. General
- II. Nondiscrimination
- III. Nonsegregated Facilities
- IV. Davis-Bacon and Related Act Provisions
- V. Contract Work Hours and Safety Standards Act Provisions
- VI. Subletting or Assigning the Contract
- VII. Safety: Accident Prevention
- VIII. False Statements Concerning Highway Projects
- IX. Implementation of Clean Air Act and Federal Water Pollution Control Act
- X. Compliance with Governmentwide Suspension and Debarment Requirements
- XI. Certification Regarding Use of Contract Funds for Lobbying

**ATTACHMENTS**

- A. Employment and Materials Preference for Appalachian Development Highway System or Appalachian Local Access Road Contracts (included in Appalachian contracts only)

**I. GENERAL**

1. Form FHWA-1273 must be physically incorporated in each construction contract funded under Title 23 (excluding emergency contracts solely intended for debris removal). The contractor (or subcontractor) must insert this form in each subcontract and further require its inclusion in all lower tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services).  
The applicable requirements of Form FHWA-1273 are incorporated by reference for work done under any purchase order, rental agreement or agreement for other services. The prime contractor shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider.  
Form FHWA-1273 must be included in all Federal-aid design-build contracts, in all subcontracts and in lower tier subcontracts (excluding subcontracts for design services, purchase orders, rental agreements and other agreements for supplies or services). The design-builder shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider.  
Contracting agencies may reference Form FHWA-1273 in bid proposal or request for proposal documents, however, the Form FHWA-1273 must be physically incorporated (not referenced) in all contracts, subcontracts and lower-tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services related to a construction contract).
2. Subject to the applicability criteria noted in the following sections, these contract provisions shall apply to all work performed on the contract by the contractor's own organization and with the assistance of workers under the contractor's immediate superintendence and to all work performed on the contract by piecework, station work, or by subcontract.
3. A breach of any of the stipulations contained in these Required Contract Provisions may be sufficient grounds for withholding of progress payments, withholding of final payment, termination of the contract, suspension / debarment or any other action determined to be appropriate by the contracting agency and FHWA.
4. Selection of Labor: During the performance of this contract, the contractor shall not use convict labor for any purpose within the limits of a construction project on a Federal-aid highway unless it is labor performed by convicts who are on parole, supervised release, or probation. The term Federal-aid highway does not include roadways functionally classified as local roads or rural minor collectors.

**II. NONDISCRIMINATION**

The provisions of this section related to 23 CFR Part 230 are applicable to all Federal-aid construction contracts and to all related construction subcontracts of \$10,000 or more. The provisions of 23 CFR Part 230 are not applicable to material supply, engineering, or architectural service contracts.

In addition, the contractor and all subcontractors must comply with the following policies: Executive Order 11246, 41 CFR 60, 29 CFR 1625-1627, Title 23 USC Section 140, the Rehabilitation Act of 1973, as amended (29 USC 794), Title VI of the Civil Rights Act of 1964, as amended, and related regulations including 49 CFR Parts 21, 26 and 27; and 23 CFR Parts 200, 230, and 633.

The contractor and all subcontractors must comply with: the requirements of the Equal Opportunity Clause in 41 CFR 60-1.4(b) and, for all construction contracts exceeding \$10,000, the Standard Federal Equal Employment Opportunity Construction Contract Specifications in 41 CFR 60-4.3.

Note: The U.S. Department of Labor has exclusive authority to determine compliance with Executive Order 11246 and the policies of the Secretary of Labor including 41 CFR 60, and 29 CFR 1625-1627. The contracting agency and the FHWA have the authority and the responsibility to ensure compliance with Title 23 USC Section 140, the Rehabilitation Act of 1973, as amended (29 USC 794), and Title VI of the Civil Rights Act of 1964, as amended, and related regulations including 49 CFR Parts 21, 26 and 27; and 23 CFR Parts 200, 230, and 633.

The following provision is adopted from 23 CFR 230, Appendix A, with appropriate revisions to conform to the U.S. Department of Labor (US DOL) and FHWA requirements.

1. **Equal Employment Opportunity:** Equal employment opportunity (EEO) requirements not to discriminate and to take affirmative action to assure equal opportunity as set forth under laws, executive orders, rules, regulations (28 CFR 35, 29 CFR 1630, 29 CFR 1625-1627, 41 CFR 60 and 49 CFR 27) and orders of the Secretary of Labor as modified by the provisions prescribed herein, and imposed pursuant to 23 U.S.C. 140 shall constitute the EEO and specific affirmative action standards for the contractor's project activities under this contract. The provisions of the Americans with Disabilities Act of 1990 (42 U.S.C. 12101 et seq.) set forth under 28 CFR 35 and 29 CFR 1630 are incorporated by reference in this contract. In the execution of this contract, the contractor agrees to comply with the following minimum specific requirement activities of EEO:
  - a. The contractor will work with the contracting agency and the Federal Government to ensure that it has made every good faith effort to provide equal opportunity with respect to all of its terms and conditions of employment and in their review of activities under the contract.
  - b. The contractor will accept as its operating policy the following statement:

- "It is the policy of this Company to assure that applicants are employed, and that employees are treated during employment, without regard to their race, religion, sex, color, national origin, age or disability. Such action shall include: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship, pre-apprenticeship, and/or on-the-job training."
2. **EEO Officer:** The contractor will designate and make known to the contracting officers an EEO Officer who will have the responsibility for and must be capable of effectively administering and promoting an active EEO program and who must be assigned adequate authority and responsibility to do so.
  3. **Dissemination of Policy:** All members of the contractor's staff who are authorized to hire, supervise, promote, and discharge employees, or who recommend such action, or who are substantially involved in such action, will be made fully cognizant of, and will implement, the contractor's EEO policy and contractual responsibilities to provide EEO in each grade and classification of employment. To ensure that the above agreement will be met, the following actions will be taken as a minimum:
    - a. Periodic meetings of supervisory and personnel office employees will be conducted before the start of work and then not less often than once every six months, at which time the contractor's EEO policy and its implementation will be reviewed and explained. The meetings will be conducted by the EEO Officer.
    - b. All new supervisory or personnel office employees will be given a thorough indoctrination by the EEO Officer, covering all major aspects of the contractor's EEO obligations within thirty days following their reporting for duty with the contractor.
    - c. All personnel who are engaged in direct recruitment for the project will be instructed by the EEO Officer in the contractor's procedures for locating and hiring minorities and women.
    - d. Notices and posters setting forth the contractor's EEO policy will be placed in areas readily accessible to employees, applicants for employment and potential employees.
    - e. The contractor's EEO policy and the procedures to implement such policy will be brought to the attention of employees by means of meetings, employee handbooks, or other appropriate means.
  4. **Recruitment:** When advertising for employees, the contractor will include in all advertisements for employees the notation: "An Equal Opportunity Employer." All such advertisements will be placed in publications having a large circulation among minorities and women in the area from which the project work force would normally be derived.
    - a. The contractor will, unless precluded by a valid bargaining agreement, conduct systematic and direct recruitment through public and private employee referral sources likely to yield qualified minorities and women. To meet this requirement, the contractor will identify sources of potential minority group employees, and establish with such identified sources procedures whereby minority and women applicants may be referred to the contractor for employment consideration.
    - b. In the event the contractor has a valid bargaining agreement providing for exclusive hiring hall referrals, the contractor is expected to observe the provisions of that agreement to the extent that the system meets the contractor's compliance with EEO contract provisions. Where implementation of such an agreement has the effect of discriminating against minorities or women, or obligates the contractor to do the same, such implementation violates Federal nondiscrimination provisions.
    - c. The contractor will encourage its present employees to refer minorities and women as applicants for employment. Information and procedures with regard to referring such applicants will be discussed with employees.
  5. **Personnel Actions:** Wages, working conditions, and employee benefits shall be established and administered, and personnel actions of every type, including hiring, upgrading, promotion, transfer, demotion, layoff, and termination, shall be taken without regard to race, color, religion, sex, national origin, age or disability. The following procedures shall be followed:
    - a. The contractor will conduct periodic inspections of project sites to insure that working conditions and employee facilities do not indicate discriminatory treatment of project site personnel.
    - b. The contractor will periodically evaluate the spread of wages paid within each classification to determine any evidence of discriminatory wage practices.
    - c. The contractor will periodically review selected personnel actions in depth to determine whether there is evidence of discrimination. Where evidence is found, the contractor will promptly take corrective action. If the review indicates that the discrimination may extend beyond the actions reviewed, such corrective action shall include all affected persons.
    - d. The contractor will promptly investigate all complaints of alleged discrimination made to the contractor in connection with its obligations under this contract, will attempt to resolve such complaints, and will take appropriate corrective action within a reasonable time. If the investigation indicates that the discrimination may affect persons other than the complainant, such corrective action shall include such other persons. Upon completion of each investigation, the contractor will inform every complainant of all of their avenues of appeal.
  6. **Training and Promotion:**
    - a. The contractor will assist in locating, qualifying, and increasing the skills of minorities and women who are applicants for employment or current employees. Such efforts should be aimed at developing full journey level status employees in the type of trade or job classification involved.
    - b. Consistent with the contractor's work force requirements and as permissible under Federal and State regulations, the contractor shall make full use of training programs, i.e., apprenticeship, and on-the-job training programs for the geographical area of contract performance. In the event a special provision for training is provided under this contract, this subparagraph will be superseded as indicated in the special provision. The contracting agency may reserve training positions for persons who receive welfare assistance in accordance with 23 U.S.C. 140(a).
    - c. The contractor will advise employees and applicants for employment of available training programs and entrance requirements for each.
    - d. The contractor will periodically review the training and promotion potential of employees who are minorities and women and will encourage eligible employees to apply for such training and promotion.
  7. **Unions:** If the contractor relies in whole or in part upon unions as a source of employees, the contractor will use good faith efforts to obtain the cooperation of such unions to increase opportunities for minorities and women. Actions by the contractor, either directly or through a contractor's association acting as agent, will include the procedures set forth below:
    - a. The contractor will use good faith efforts to develop, in cooperation with the unions, joint training programs aimed toward qualifying more minorities and women for membership in the unions and increasing the skills of minorities and women so that they may qualify for higher paying employment.
    - b. The contractor will use good faith efforts to incorporate an EEO clause into each union agreement to the end that such union will be contractually bound to refer applicants without regard to their race, color, religion, sex, national origin, age or disability.
    - c. The contractor is to obtain information as to the referral practices and policies of the labor union except that to the extent such information is within the exclusive possession of the labor union and such labor union refuses to furnish such information to the contractor, the contractor shall so certify to the contracting agency and shall set forth what efforts have been made to obtain such information.

- d. In the event the union is unable to provide the contractor with a reasonable flow of referrals within the time limit set forth in the collective bargaining agreement, the contractor will, through independent recruitment efforts, fill the employment vacancies without regard to race, color, religion, sex, national origin, age or disability; making full efforts to obtain qualified and/or qualifiable minorities and women. The failure of a union to provide sufficient referrals (even though it is obligated to provide exclusive referrals under the terms of a collective bargaining agreement) does not relieve the contractor from the requirements of this paragraph. In the event the union referral practice prevents the contractor from meeting the obligations pursuant to Executive Order 11246, as amended, and these special provisions, such contractor shall immediately notify the contracting agency.
8. **Reasonable Accommodation for Applicants / Employees with Disabilities:** The contractor must be familiar with the requirements for and comply with the Americans with Disabilities Act and all rules and regulations established there under. Employers must provide reasonable accommodation in all employment activities unless to do so would cause an undue hardship.
9. **Selection of Subcontractors, Procurement of Materials and Leasing of Equipment:** The contractor shall not discriminate on the grounds of race, color, religion, sex, national origin, age or disability in the selection and retention of subcontractors, including procurement of materials and leases of equipment. The contractor shall take all necessary and reasonable steps to ensure nondiscrimination in the administration of this contract.
  - a. The contractor shall notify all potential subcontractors and suppliers and lessors of their EEO obligations under this contract.
  - b. The contractor will use good faith efforts to ensure subcontractor compliance with their EEO obligations.
10. **Assurance Required by 49 CFR 26.13(b):**
  - a. The requirements of 49 CFR Part 26 and the State DOT's U.S. DOT-approved DBE program are incorporated by reference.
  - b. The contractor or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of DOT-assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the contracting agency deems appropriate.
11. **Records and Reports:** The contractor shall keep such records as necessary to document compliance with the EEO requirements. Such records shall be retained for a period of three years following the date of the final payment to the contractor for all contract work and shall be available at reasonable times and places for inspection by authorized representatives of the contracting agency and the FHWA.
  - a. The records kept by the contractor shall document the following:
    - (1) The number and work hours of minority and non-minority group members and women employed in each work classification on the project;
    - (2) The progress and efforts being made in cooperation with unions, when applicable, to increase employment opportunities for minorities and women; and
    - (3) The progress and efforts being made in locating, hiring, training, qualifying, and upgrading minorities and women;
  - b. The contractors and subcontractors will submit an annual report to the contracting agency each July for the duration of the project, indicating the number of minority, women, and non-minority group employees currently engaged in each work classification required by the contract work. This information is to be reported on Form FHWA-1391. The staffing data should represent the project work force on board in all or any part of the last payroll period preceding the end of July. If on-the-job training is being required by special provision, the contractor will be required to collect and report training data. The employment data should reflect the work force on board during all or any part of the last payroll period preceding the end of July.

### III. NONSEGREGATED FACILITIES

This provision is applicable to all Federal-aid construction contracts and to all related construction subcontracts of \$10,000 or more.

The contractor must ensure that facilities provided for employees are provided in such a manner that segregation on the basis of race, color, religion, sex, or national origin cannot result. The contractor may neither require such segregated use by written or oral policies nor tolerate such use by employee custom. The contractor's obligation extends further to ensure that its employees are not assigned to perform their services at any location, under the contractor's control, where the facilities are segregated. The term "facilities" includes waiting rooms, work areas, restaurants and other eating areas, time clocks, restrooms, washrooms, locker rooms, and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing provided for employees. The contractor shall provide separate or single-user restrooms and necessary dressing or sleeping areas to assure privacy between sexes.

### IV. DAVIS-BACON AND RELATED ACT PROVISIONS

This section is applicable to all Federal-aid construction projects exceeding \$2,000 and to all related subcontracts and lower-tier subcontracts (regardless of subcontract size). The requirements apply to all projects located within the right-of-way of a roadway that is functionally classified as Federal-aid highway. This excludes roadways functionally classified as local roads or rural minor collectors, which are exempt. Contracting agencies may elect to apply these requirements to other projects.

The following provisions are from the U.S. Department of Labor regulations in 29 CFR 5.5 "Contract provisions and related matters" with minor revisions to conform to the FHWA-1273 format and FHWA program requirements.

#### 1. Minimum wages

- a. All laborers and mechanics employed or working upon the site of the work, will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics.

Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph 1.d. of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided, That the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under paragraph 1.b. of this section) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.



- b. (1) The contracting officer shall require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The contracting officer shall approve an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:
    - (i) The work to be performed by the classification requested is not performed by a classification in the wage determination; and
    - (ii) The classification is utilized in the area by the construction industry; and
    - (iii) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.
  - (2) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the contracting officer to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, DC 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.
  - (3) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer shall refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Wage and Hour Administrator for determination. The Wage and Hour Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.
  - (4) The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs 1.b.(2) or 1.b.(3) of this section, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.
- c. Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.
  - d. If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program. Provided, That the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.
2. **Withholding.** The contracting agency shall upon its own action or upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld from the contractor under this contract, or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work, all or part of the wages required by the contract, the contracting agency may, after written notice to the contractor, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.
  3. **Payrolls and basic records**
    - a. Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.
    - b. (1) The contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the contracting agency. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on weekly transmittals. Instead the payrolls shall only need to include an individually identifying number for each employee ( e.g. , the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH-347 is available for this purpose from the Wage and Hour Division Web site at <http://www.dol.gov/esa/whd/forms/wh347instr.htm> or its successor site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to the contracting agency for transmission to the State DOT, the FHWA or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this section for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to the contracting agency.
    - (2) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:
      - (i) That the payroll for the payroll period contains the information required to be provided under §5.5 (a)(3)(ii) of Regulations, 29 CFR part 5, the appropriate information is being maintained under §5.5 (a)(3)(i) of Regulations, 29 CFR part 5, and that such information is correct and complete;
      - (ii) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in Regulations, 29 CFR part 3;
      - (iii) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

- (3) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph 3.b.(2) of this section.
- (4) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under section 1001 of title 18 and section 231 of title 31 of the United States Code.
- c. The contractor or subcontractor shall make the records required under paragraph 3.a. of this section available for inspection, copying, or transcription by authorized representatives of the contracting agency, the State DOT, the FHWA, or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, the FHWA may, after written notice to the contractor, the contracting agency or the State DOT, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.
4. **Apprentices and trainees**
- a. Apprentices (programs of the USDOL). Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice.
- The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed.
- Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination.
- In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.
- b. Trainees (programs of the USDOL). Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration.
- The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration.
- Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed.
- In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.
- c. Equal employment opportunity. The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR part 30.
- d. Apprentices and Trainees (programs of the U.S. DOT). Apprentices and trainees working under apprenticeship and skill training programs which have been certified by the Secretary of Transportation as promoting EEO in connection with Federal-aid highway construction programs are not subject to the requirements of paragraph 4 of this Section IV. The straight time hourly wage rates for apprentices and trainees under such programs will be established by the particular programs. The ratio of apprentices and trainees to journeymen shall not be greater than permitted by the terms of the particular program.
5. **Compliance with Copeland Act requirements.** The contractor shall comply with the requirements of 29 CFR part 3, which are incorporated by reference in this contract.
6. **Subcontracts.** The contractor or subcontractor shall insert Form FHWA-1273 in any subcontracts and also require the subcontractors to include Form FHWA-1273 in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR 5.5.
7. **Contract termination:** debarment. A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.
8. **Compliance with Davis-Bacon and Related Act requirements.** All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR parts 1, 3, and 5 are herein incorporated by reference in this contract.
9. **Disputes concerning labor standards.** Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and the contracting agency, the U.S. Department of Labor, or the employees or their representatives.
10. **Certification of eligibility.**
- a. By entering into this contract, the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

- b. No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).
- c. The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.

#### V. CONTRACT WORK HOURS AND SAFETY STANDARDS ACT

The following clauses apply to any Federal-aid construction contract in an amount in excess of \$100,000 and subject to the overtime provisions of the Contract Work Hours and Safety Standards Act. These clauses shall be inserted in addition to the clauses required by 29 CFR 5.5(a) or 29 CFR 4.6. As used in this paragraph, the terms laborers and mechanics include watchmen and guards.

1. **Overtime requirements.** No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.
2. **Violation; liability for unpaid wages; liquidated damages.** In the event of any violation of the clause set forth in paragraph (1.) of this section, the contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph (1.) of this section, in the sum of \$10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph (1.) of this section.
3. **Withholding for unpaid wages and liquidated damages.** The FHWA or the contacting agency shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph (2.) of this section.
4. **Subcontracts.** The contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraph (1.) through (4.) of this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs (1.) through (4.) of this section.

#### VI. SUBLETTING OR ASSIGNING THE CONTRACT

This provision is applicable to all Federal-aid construction contracts on the National Highway System.

1. The contractor shall perform with its own organization contract work amounting to not less than 30 percent (or a greater percentage if specified elsewhere in the contract) of the total original contract price, excluding any specialty items designated by the contracting agency. Specialty items may be performed by subcontract and the amount of any such specialty items performed may be deducted from the total original contract price before computing the amount of work required to be performed by the contractor's own organization (23 CFR 635.116).
  - a. The term "perform work with its own organization" refers to workers employed or leased by the prime contractor, and equipment owned or rented by the prime contractor, with or without operators. Such term does not include employees or equipment of a subcontractor or lower tier subcontractor, agents of the prime contractor, or any other assignees. The term may include payments for the costs of hiring leased employees

from an employee leasing firm meeting all relevant Federal and State regulatory requirements. Leased employees may only be included in this term if the prime contractor meets all of the following conditions:

- (1) the prime contractor maintains control over the supervision of the day-to-day activities of the leased employees;
  - (2) the prime contractor remains responsible for the quality of the work of the leased employees;
  - (3) the prime contractor retains all power to accept or exclude individual employees from work on the project; and
  - (4) the prime contractor remains ultimately responsible for the payment of predetermined minimum wages, the submission of payrolls, statements of compliance and all other Federal regulatory requirements.
- b. "Specialty Items" shall be construed to be limited to work that requires highly specialized knowledge, abilities, or equipment not ordinarily available in the type of contracting organizations qualified and expected to bid or propose on the contract as a whole and in general are to be limited to minor components of the overall contract.
2. The contract amount upon which the requirements set forth in paragraph (1) of Section VI is computed includes the cost of material and manufactured products which are to be purchased or produced by the contractor under the contract provisions.
  3. The contractor shall furnish (a) a competent superintendent or supervisor who is employed by the firm, has full authority to direct performance of the work in accordance with the contract requirements, and is in charge of all construction operations (regardless of who performs the work) and (b) such other of its own organizational resources (supervision, management, and engineering services) as the contracting officer determines is necessary to assure the performance of the contract.
  4. No portion of the contract shall be sublet, assigned or otherwise disposed of except with the written consent of the contracting officer, or authorized representative, and such consent when given shall not be construed to relieve the contractor of any responsibility for the fulfillment of the contract. Written consent will be given only after the contracting agency has assured that each subcontract is evidenced in writing and that it contains all pertinent provisions and requirements of the prime contract.
  5. The 30% self-performance requirement of paragraph (1) is not applicable to design-build contracts; however, contracting agencies may establish their own self-performance requirements.

#### **VII. SAFETY: ACCIDENT PREVENTION**

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

1. In the performance of this contract the contractor shall comply with all applicable Federal, State, and local laws governing safety, health, and sanitation (23 CFR 635). The contractor shall provide all safeguards, safety devices and protective equipment and take any other needed actions as it determines, or as the contracting officer may determine, to be reasonably necessary to protect the life and health of employees on the job and the safety of the public and to protect property in connection with the performance of the work covered by the contract.
2. It is a condition of this contract, and shall be made a condition of each subcontract, which the contractor enters into pursuant to this contract, that the contractor and any subcontractor shall not permit any employee, in performance of the contract, to work in surroundings or under conditions which are unsanitary, hazardous or dangerous to his/her health or safety, as determined under construction safety and health standards (29 CFR 1926) promulgated by the Secretary of Labor, in accordance with Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 3704).
3. Pursuant to 29 CFR 1926.3, it is a condition of this contract that the Secretary of Labor or authorized representative thereof, shall have right of entry to any site of contract performance to inspect or investigate the matter of compliance with the construction safety and health standards and to carry out the duties of the Secretary under Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C.3704).

#### **VIII. FALSE STATEMENTS CONCERNING HIGHWAY PROJECTS**

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

In order to assure high quality and durable construction in conformity with approved plans and specifications and a high degree of reliability on statements and representations made by engineers, contractors, suppliers, and workers on Federal-aid highway projects, it is essential that all persons concerned with the project perform their functions as carefully, thoroughly, and honestly as possible. Willful falsification, distortion, or misrepresentation with respect to any facts related to the project is a violation of Federal law. To prevent any misunderstanding regarding the seriousness of these and similar acts, Form FHWA-1022 shall be posted on each Federal-aid highway project (23 CFR 635) in one or more places where it is readily available to all persons concerned with the project:

18 U.S.C. 1020 reads as follows:

"Whoever, being an officer, agent, or employee of the United States, or of any State or Territory, or whoever, whether a person, association, firm, or corporation, knowingly makes any false statement, false representation, or false report as to the character, quality, quantity, or cost of the material used or to be used, or the quantity or quality of the work performed or to be performed, or the cost thereof in connection with the submission of plans, maps, specifications, contracts, or costs of construction on any highway or related project submitted for approval to the Secretary of Transportation; or

Whoever knowingly makes any false statement, false representation, false report or false claim with respect to the character, quality, quantity, or cost of any work performed or to be performed, or materials furnished or to be furnished, in connection with the construction of any highway or related project approved by the Secretary of Transportation; or

Whoever knowingly makes any false statement or false representation as to material fact in any statement, certificate, or report submitted pursuant to provisions of the Federal-aid Roads Act approved July 1, 1916, (39 Stat. 355), as amended and supplemented;

Shall be fined under this title or imprisoned not more than 5 years or both."

#### **IX. IMPLEMENTATION OF CLEAN AIR ACT AND FEDERAL WATER POLLUTION CONTROL ACT**

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

By submission of this bid/proposal or the execution of this contract, or subcontract, as appropriate, the bidder, proposer, Federal-aid construction contractor, or subcontractor, as appropriate, will be deemed to have stipulated as follows:

1. That any person who is or will be utilized in the performance of this contract is not prohibited from receiving an award due to a violation of Section 508 of the Clean Water Act or Section 306 of the Clean Air Act.
2. That the contractor agrees to include or cause to be included the requirements of paragraph (1) of this Section X in every subcontract, and further agrees to take such action as the contracting agency may direct as a means of enforcing such requirements.

#### **X. CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND VOLUNTARY EXCLUSION**

This provision is applicable to all Federal-aid construction contracts, design-build contracts, subcontracts, lower-tier subcontracts, purchase orders, lease agreements, consultant contracts or any other covered transaction requiring FHWA approval or that is estimated to cost \$25,000 or more – as defined in 2 CFR Parts 180 and 1200.

**1. Instructions for Certification – First Tier Participants:**

- a. By signing and submitting this proposal, the prospective first tier participant is providing the certification set out below.
- b. The inability of a person to provide the certification set out below will not necessarily result in denial of participation in this covered transaction. The prospective first tier participant shall submit an explanation of why it cannot provide the certification set out below. The certification or explanation will be considered in connection with the department or agency's determination whether to enter into this transaction. However, failure of the prospective first tier participant to furnish a certification or an explanation shall disqualify such a person from participation in this transaction.
- c. The certification in this clause is a material representation of fact upon which reliance was placed when the contracting agency determined to enter into this transaction. If it is later determined that the prospective participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the contracting agency may terminate this transaction for cause of default.
- d. The prospective first tier participant shall provide immediate written notice to the contracting agency to whom this proposal is submitted if any time the prospective first tier participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.
- e. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180 and 1200. "First Tier Covered Transactions" refers to any covered transaction between a grantee or subgrantee of Federal funds and a participant (such as the prime or general contract). "Lower Tier Covered Transactions" refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). "First Tier Participant" refers to the participant who has entered into a covered transaction with a grantee or subgrantee of Federal funds (such as the prime or general contractor). "Lower Tier Participant" refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).
- f. The prospective first tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency entering into this transaction.
- g. The prospective first tier participant further agrees by submitting this proposal that it will include the clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transactions," provided by the department or contracting agency, entering into this covered transaction, without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the \$25,000 threshold.
- h. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the Excluded Parties List System website (<https://www.epls.gov/>), which is compiled by the General Services Administration.
- i. Nothing contained in the foregoing shall be construed to require the establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of the prospective participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.
- j. Except for transactions authorized under paragraph (f) of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause or default.

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**2. Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion – First Tier Participants:**

- a. The prospective first tier participant certifies to the best of its knowledge and belief, that it and its principals:
  - (1) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency;
  - (2) Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;
  - (3) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph (a)(2) of this certification; and
  - (4) Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default.
- b. Where the prospective participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

**2. Instructions for Certification - Lower Tier Participants:**

(Applicable to all subcontracts, purchase orders and other lower tier transactions requiring prior FHWA approval or estimated to cost \$25,000 or more - 2 CFR Parts 180 and 1200)

- a. By signing and submitting this proposal, the prospective lower tier is providing the certification set out below.
- b. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department, or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.
- c. The prospective lower tier participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous by reason of changed circumstances.
- d. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180 and 1200. You may contact the person to which this proposal is submitted for assistance in obtaining a copy of those regulations. "First Tier Covered Transactions" refers to any covered transaction between a grantee or subgrantee of

Federal funds and a participant (such as the prime or general contract). "Lower Tier Covered Transactions" refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). "First Tier Participant" refers to the participant who has entered into a covered transaction with a grantee or subgrantee of Federal funds (such as the prime or general contractor). "Lower Tier Participant" refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

- e. The prospective lower tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated.
- f. The prospective lower tier participant further agrees by submitting this proposal that it will include this clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction," without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the \$25,000 threshold.
- g. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the Excluded Parties List System website (<https://www.epls.gov/>), which is compiled by the General Services Administration.
- h. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.
- i. Except for transactions authorized under paragraph e of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

\* \* \* \* \*

**Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion--Lower Tier Participants:**

1. The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency.
2. Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

\* \* \* \* \*

**XI. CERTIFICATION REGARDING USE OF CONTRACT FUNDS FOR LOBBYING**

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts which exceed \$100,000 (49 CFR 20).

1. The prospective participant certifies, by signing and submitting this bid or proposal, to the best of his or her knowledge and belief, that:
  - a. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.
  - b. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.
2. This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31 U.S.C. 1352. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.
3. The prospective participant also agrees by submitting its bid or proposal that the participant shall require that the language of this certification be included in all lower tier subcontracts, which exceed \$100,000 and that all such recipients shall certify and disclose accordingly.

**STANDARD SPECIAL PROVISION****ON-THE-JOB TRAINING**

(10-16-07) (Rev. 4-21-15)

Z-10

**Description**

The North Carolina Department of Transportation will administer a custom version of the Federal On-the-Job Training (OJT) Program, commonly referred to as the Alternate OJT Program. All contractors (existing and newcomers) will be automatically placed in the Alternate Program. Standard OJT requirements typically associated with individual projects will no longer be applied at the project level. Instead, these requirements will be applicable on an annual basis for each contractor administered by the OJT Program Manager.

On the Job Training shall meet the requirements of 23 CFR 230.107 (b), 23 USC – Section 140, this provision and the On-the-Job Training Program Manual.

The Alternate OJT Program will allow a contractor to train employees on Federal, State and privately funded projects located in North Carolina. However, priority shall be given to training employees on NCDOT Federal-Aid funded projects.

**Minorities and Women**

Developing, training and upgrading of minorities and women toward journeyman level status is a primary objective of this special training provision. Accordingly, the Contractor shall make every effort to enroll minority and women as trainees to the extent that such persons are available within a reasonable area of recruitment. This training commitment is not intended, and shall not be used, to discriminate against any applicant for training, whether a member of a minority group or not.

**Assigning Training Goals**

The Department, through the OJT Program Manager, will assign training goals for a calendar year based on the contractors' past three years' activity and the contractors' anticipated upcoming year's activity with the Department. At the beginning of each year, all contractors eligible will be contacted by the Department to determine the number of trainees that will be assigned for the upcoming calendar year. At that time the Contractor shall enter into an agreement with the Department to provide a self-imposed on-the-job training program for the calendar year. This agreement will include a specific number of annual training goals agreed to by both parties. The number of training assignments may range from 1 to 15 per contractor per calendar year. The Contractor shall sign an agreement to fulfill their annual goal for the year.\

**Training Classifications**

The Contractor shall provide on-the-job training aimed at developing full journeyman level workers in the construction craft/operator positions. Preference shall be given to providing training in the following skilled work classifications:

Equipment Operators	Office Engineers
Truck Drivers	Estimators
Carpenters	Iron / Reinforcing Steel Workers
Concrete Finishers	Mechanics
Pipe Layers	Welders

The Department has established common training classifications and their respective training requirements that may be used by the contractors. However, the classifications established are not all-inclusive. Where the training is oriented toward construction applications, training will be allowed in lower-level management positions such as office engineers and estimators. Contractors shall submit new classifications for specific job functions that their employees are performing. The Department will review and recommend for acceptance to FHWA the new classifications proposed by contractors, if applicable. New classifications shall meet the following requirements:

Proposed training classifications are reasonable and realistic based on the job skill classification needs, and

The number of training hours specified in the training classification is consistent with common practices and provides enough time for the trainee to obtain journeyman level status.

The Contractor may allow trainees to be trained by a subcontractor provided that the Contractor retains primary responsibility for meeting the training and this provision is made applicable to the subcontract. However, only the Contractor will receive credit towards the annual goal for the trainee.

Where feasible, 25 percent of apprentices or trainees in each occupation shall be in their first year of apprenticeship or training. The number of trainees shall be distributed among the work classifications on the basis of the contractor's needs and the availability of journeymen in the various classifications within a reasonable area of recruitment.

No employee shall be employed as a trainee in any classification in which they have successfully completed a training course leading to journeyman level status or in which they have been employed as a journeyman.

**Records and Reports**

The Contractor shall maintain enrollment, monthly and completion reports documenting company compliance under these contract documents. These documents and any other information as requested shall be submitted to the OJT Program Manager.



Upon completion and graduation of the program, the Contractor shall provide each trainee with a certification Certificate showing the type and length of training satisfactorily completed.

**Trainee Interviews**

All trainees enrolled in the program will receive an initial and Trainee/Post graduate interview conducted by the OJT program staff.

**Trainee Wages**

Contractors shall compensate trainees on a graduating pay scale based upon a percentage of the prevailing minimum journeyman wages (Davis-Bacon Act). Minimum pay shall be as follows:

60 percent	of the journeyman wage for the first half of the training period
75 percent	of the journeyman wage for the third quarter of the training period
90 percent	of the journeyman wage for the last quarter of the training period

In no instance shall a trainee be paid less than the local minimum wage. The Contractor shall adhere to the minimum hourly wage rate that will satisfy both the NC Department of Labor (NCDOL) and the Department.

**Achieving or Failing to Meet Training Goals**

The Contractor will be credited for each trainee employed by him on the contract work who is currently enrolled or becomes enrolled in an approved program and who receives training for at least 50 percent of the specific program requirement. Trainees will be allowed to be transferred between projects if required by the Contractor's scheduled workload to meet training goals.

If a contractor fails to attain their training assignments for the calendar year, they may be taken off the NCDOT's Bidders List.

**Measurement and Payment**

No compensation will be made for providing required training in accordance with these contract documents.

**STANDARD SPECIAL PROVISION**  
**MINIMUM WAGES**  
**GENERAL DECISION NC180101 01/05/2018 NC101**

Z-101

Date: January 5, 2018

General Decision Number: NC180101 01/05/2018 NC101

Superseded General Decision Numbers: NC20170101

State: North Carolina

Construction Type: HIGHWAY

**COUNTIES:**

Alamance	Forsyth	Randolph
Anson	Gaston	Rockingham
Cabarrus	Guilford	Stokes
Chatham	Mecklenburg	Union
Davie	Orange	Yadkin
Durham	Person	

HIGHWAY CONSTRUCTION PROJECTS (excluding tunnels, building structures in rest area projects & railroad construction; bascule, suspension & spandrel arch bridges designed for commercial navigation, bridges involving marine construction; and other major bridges).

Note: Under Executive Order (EO) 13658, an hourly minimum wage of \$10.35 for calendar year 2018 applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least \$10.35 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract for calendar year 2018. The EO minimum wage rate will be adjusted annually. Please note that this EO applies to the above-mentioned types of contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but it does not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2) – (60). Additional information on contractor requirements and worker protections under the EO is available at [www.dol.gov/whd/govcontracts](http://www.dol.gov/whd/govcontracts).

Modification Number  
0

Publication Date  
01/05/2018

SUNC2014-003 11/14/2014

	Rates	Fringes
BLASTER	18.64	
CARPENTER	13.68	.05
CEMENT MASON/CONCRETE FINISHER	13.93	
ELECTRICIAN		
Electrician	18.79	2.72
Telecommunications Technician	15.19	1.25
IRONWORKER	13.30	
LABORER		
Asphalt Raker and Spreader	12.78	

	Rates	Fringes
Asphalt Screed/Jackman	14.50	
Carpenter Tender	12.51	.27
Cement Mason/Concrete Finisher Tender	11.04	
Common or General	10.40	.01
Guardrail/Fence Installer	13.22	
Pipelayer	12.43	
Traffic Signal/Lighting Installer	15.65	.24
<b>PAINTER</b>		
Bridge	23.77	
<b>POWER EQUIPMENT OPERATORS</b>		
Asphalt Broom Tractor	10.00	
Bulldozer Fine	16.13	
Bulldozer Rough	14.36	
Concrete Grinder/Groover	17.92	
Crane Boom Trucks	18.19	
Crane Other	19.83	
Crane Rough/All-Terrain	19.10	
Drill Operator Rock	14.28	
Drill Operator Structure	20.89	
Excavator Fine	16.95	
Excavator Rough	13.63	
Grader/Blade Fine	19.84	
Grader/Blade Rough	15.47	
Loader 2 Cubic Yards or Less	13.31	
Loader Greater Than 2 Cubic Yards	16.19	
Material Transfer Vehicle (Shuttle Buggy)	15.44	
Mechanic	17.51	
Milling Machine	15.22	
Off-Road Hauler/Water Tanker	11.83	
Oiler/Greaser	14.16	
Pavement Marking Equipment	12.05	
Paver Asphalt	15.97	
Paver Concrete	18.20	
Roller Asphalt Breakdown	12.79	
Roller Asphalt Finish	13.76	
Roller Other	12.08	
Scraper Finish	12.65	
Scraper Rough	11.50	
Slip Form Machine	19.60	
Tack Truck/Distributor Operator	14.82	
<b>TRUCK DRIVER</b>		
GVWR of 26,000 Lbs or Less	11.45	
GVWR of 26,000 Lbs or Greater	13.57	.03

Welders – Receive rate prescribed for craft performing operation to which welding is incidental.

Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a

family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at [www.dol.gov/whd/govcontracts](http://www.dol.gov/whd/govcontracts).

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29 CFR 5.5(a)(1)(ii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of "identifiers" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

#### Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than "SU" or "UAVG" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

#### Survey Rate Identifiers

Classifications listed under the "SU" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

#### Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number

used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

#### WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

- \* an existing published wage determination
- \* a survey underlying a wage determination
- \* a Wage and Hour Division letter setting forth a position on a wage determination matter
- \* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations  
Wage and Hour Division  
U. S. Department of Labor  
200 Constitution Avenue, N.W.  
Washington, D.C. 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator  
U.S. Department of Labor  
200 Constitution Avenue, N.W.  
Washington, D.C. 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board  
U.S. Department of Labor  
200 Constitution Avenue, N.W.  
Washington, D.C. 20210

4.) All decisions by the Administrative Review Board are final.

## **SPECIAL PROVISIONS FOR TIGER GRANT FUNDING REQUIREMENTS**

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#### **MINIMUM WAGE RATES**

Minimum rates of wages shall be predetermined by the Secretary of Labor, in accordance with the Davis-Bacon Act, as amended (40 U.S.C. § 3141, et seq.) or 23 U.S.C. 113 as applicable, which contractors shall pay to skilled and unskilled labor, and such minimum rates shall be stated in the invitation for bids and shall be included in proposals or bids for the work.

#### **CIVIL RIGHTS ACT OF 1964**

The Department, in accordance with the provisions of Title VI of the Civil Rights Act of 1964 (78 Stat. 252, 42 U.S.C. §§ 2000d to 2000d-4) and the Regulations, hereby notifies all bidders that it will affirmatively ensure that for any contract entered into pursuant to this advertisement, disadvantaged business enterprises will be afforded full and fair opportunity to submit bids in response to this invitation and will not be discriminated against on the grounds of race, color, or national origin in consideration for an award.

#### **APPLICABLE FEDERAL CLAUSES**

During the performance of this contract, the contractor, for itself, its assignees, and successors in interest (hereinafter referred to as the “contractor”) agrees as follows:

1. **Compliance with Regulations:** The contractor (hereinafter includes consultants) will comply with the Acts and the Regulations relative to Non-discrimination in Federally assisted programs of the U.S. Department of Transportation, Federal Railroad Administration (FRA), as they may be amended from time to time, which are herein incorporated by reference and made a part of this contract.
2. **Non-discrimination:** The contractor, with regard to the work performed by it during the contract, will not discriminate on the grounds of race, color, or national origin in the selection and retention of subcontractors, including procurements of materials and leases of equipment. The contractor will not participate directly or indirectly in the discrimination prohibited by the Acts and the Regulations, including employment practices when the contract covers any activity, project, or program set forth in Appendix B of 49 C.F.R. Part 21.
3. **Solicitations for Subcontracts, Including Procurements of Materials and Equipment:** In all solicitations, either by competitive bidding, or negotiation made by the contractor for work to be performed under a subcontract, including procurements of materials, or leases of equipment, each potential subcontractor or supplier will be notified by the contractor of the contractor's obligations under this contract and the Acts and the Regulations relative to Nondiscrimination on the grounds of race, color, or national origin.
4. **Information and Reports:** The contractor will provide all information and reports required by the Acts, the Regulations, and directives issued pursuant thereto and will permit access to its books, records, accounts, other sources of information, and its facilities as may be determined by the Recipient or the FRA to be pertinent to ascertain compliance with such Acts, Regulations, and instructions. Where any information required of a contractor is in the exclusive possession of another who fails or refuses to furnish the information, the contractor will so certify to the Recipient or the FRA, as appropriate, and will set forth what efforts it has made to obtain the information.
5. **Sanctions for Noncompliance:** In the event of a contractor's noncompliance with the Non-discrimination provisions of this contract, the Recipient will impose such contract sanctions as it or the FRA may determine to be appropriate, including, but not limited to:
  - a. withholding payments to the contractor under the contract until the contractor complies; and/or
  - b. cancelling, terminating, or suspending a contract, in whole or in part.
6. **Incorporation of Provisions:** The contractor will include the provisions of paragraphs one through six in every subcontract, including procurements of materials and leases of equipment, unless exempt by the Acts, the Regulations and directives issued pursuant thereto. The contractor will take action with respect to any subcontract or procurement as the Recipient or the FRA may direct as a means of enforcing such provisions including sanctions for noncompliance. Provided, that if the contractor becomes involved in, or is threatened with litigation by a subcontractor, or supplier because of such direction, the contractor may request the Recipient to enter into any litigation to protect the interests of

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the Recipient. In addition, the contractor may request the United States to enter into the litigation to protect the interests of the United States.

### **APPLICABLE STATUTES AND AUTHORITIES**

During the performance of this contract, the contractor, for itself, its assignees, and successors in interest (hereinafter referred to as the “contractor”) agrees to comply with the following nondiscrimination statutes and authorities; including but not limited to:

Potentially Pertinent Non-Discrimination Authorities:

- Title VI of the Civil Rights Act of 1964 (42 U.S.C. § 2000d et seq., 78 stat. 252), (prohibits discrimination on the basis of race, color, national origin); and 49 C.F.R. Part 21.
- The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, (42 U.S.C. § 4601), (prohibits unfair treatment of persons displaced or whose property has been acquired because of Federal or Federal-aid programs and projects);
- Federal-Aid Highway Act of 1973, (23 U.S.C. § 324 et seq.), (prohibits discrimination on the basis of sex);
- Section 504 of the Rehabilitation Act of 1973, (29 U.S.C. § 794 et seq.), as amended, (prohibits discrimination on the basis of disability); and 49 C.F.R. Part 27;
- The Age Discrimination Act of 1975, as amended, (42 U.S.C. § 6101 et seq.), (prohibits discrimination on the basis of age);
- Airport and Airway Improvement Act of 1982, (49 U.S.C. § 471, Section 47123), as amended, (prohibits discrimination based on race, creed, color, national origin, or sex);
- The Civil Rights Restoration Act of 1987, (PL 100-209), (Broadened the scope, coverage and applicability of Title VI of the Civil Rights Act of 1964, The Age Discrimination Act of 1975 and Section 504 of the Rehabilitation Act of 1973, by expanding the definition of the terms “programs or activities” to include all of the programs or activities of the Federal-aid recipients, sub-recipients and contractors, whether such programs or activities are Federally funded or not);
- Titles II and III of the Americans with Disabilities Act, which prohibit discrimination on the basis of disability in the operation of public entities, public and private transportation systems, places of public accommodation, and certain testing entities (42 U.S.C. §§ 12131 – 12189) as implemented by Department of Transportation regulations at 49 C.F.R. Parts 37 and 38;



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- The Federal Aviation Administration's Non-discrimination statute (49 U.S.C. § 47123) (prohibits discrimination on the basis of race, color, national origin, and sex);
- Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, which ensures nondiscrimination against minority populations by discouraging programs, policies, and activities with disproportionately high and adverse human health or environmental effects on minority and low-income populations;
- Executive Order 13166, Improving Access to Services for Persons with Limited English Proficiency, and resulting agency guidance, national origin discrimination includes discrimination because of limited English proficiency (LEP). To ensure compliance with Title VI, you must take reasonable steps to ensure that LEP persons have meaningful access to your programs (70 Fed. Reg. at 74087 to 74100);
- Title IX of the Education Amendments of 1972, as amended, which prohibits you from discriminating because of sex in education programs or activities (20 U.S.C. § 1681 et seq).

## **DISCLOSURE OF LOBBYING ACTIVITIES**

### Certification for Contracts, Grants, Loans, and Agreements

The undersigned certifies, to the best of his or her knowledge and belief, that:

No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any grant agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or grant agreement.

If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or grant agreement, the undersigned shall complete and submit Standard Form-LLL (Rev. 7-97), "Disclosure of Lobbying Activities," in accordance with its instructions.

The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans and grant agreements) and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making Roadbed Roadbed Special Provisions

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or entering into this transaction imposed by 31 U.S.C. § 1352, title. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

**CERTIFICATION REGARDING DRUG FREE WORKPLACE REQUIREMENTS IN THE PERFORMANCE OF THE FY 2016 DISCRETIONARY GRANT PROGRAM**

The Recipient certifies that it will, or will continue, to provide a drug-free workplace by:

1. Publishing a statement notifying employees that the unlawful manufacture, distribution, dispensing, possession or use of a controlled substance is prohibited in the Recipient's workplace, and specifying the actions that will be taken against employees for violation of such prohibition.
2. Establishing an ongoing drug-free awareness program to inform employees about:
  - a. The dangers of drug abuse in the workplace;
  - b. The Recipient's policy of maintaining a drug-free workplace;
  - c. Any available drug counseling, rehabilitation, and employee assistance programs; and,
  - d. The penalties that may be imposed upon employees for drug abuse violations occurring in the workplace;
3. Making it a requirement that each employee to be engaged in the performance of work supported by the grant award be given a copy of the statement required by paragraph 1.
4. Notifying the employee in the statement required by paragraph 1 that, as a condition of employment supported by the grant award, the employee will:
  - a. Abide by the terms of the statement; and
  - b. Notify the employer in writing of his or her conviction for a violation of a criminal drug statute occurring in the workplace no later than five calendar days after such conviction.
5. Notifying the agency in writing, within ten calendar days after receiving notice under paragraph (d)(2) from an employee or otherwise receiving actual notice of conviction. Employers of convicted employees must provide notice, including position title, to the Department. Notice shall include the order number of the grant award.
6. Taking one of the following actions, within 30 days of receiving notice under paragraph 4(b), with respect to any employee who is so convicted:

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- a. Taking appropriate personnel action against such an employee, up to and including termination, consistent with the requirements of the Rehabilitation Act of 1973, as amended, or
  - b. Requiring such employee to participate satisfactorily in a drug abuse assistance or rehabilitation program approved for such purposes by a Federal, State or local health, law enforcement, or other appropriate agency.
7. Making a good faith effort to continue to maintain a drug-free workplace through implementation of paragraphs (a), (b), (c), (d), (e) and (f).
  8. The Recipient may, but is not required to, provide the site for the performance of work done in connection with the specific grant. For the provision of services pursuant to the agreement, workplaces include outstations, maintenance sites, headquarters office locations, training sites and any other worksites where work is performed that is supported by the grant award. If the Recipient does so, please insert in section 17 of Attachment 1 the following information from subsection (a) below:
    - a. Identify the Places of Performance by listing the street address, city, county, state, zip code. Also identify if there are workplaces on file that are not identified in this section of the agreement.

**REQUIREMENTS REGARDING DELINQUENT TAX LIABILITY OR A FELONY CONVICTION UNDER ANY FEDERAL LAW**

As required by sections 415 and 416 of Title IV, Division L of the Consolidated Appropriations Act, 2014 (Pub. L. 113-76), and similar provisions in subsequent appropriations acts, the funds provided under this award shall not be used to enter into a contract, memorandum of understanding, or cooperative agreement with, make a grant to, or provide a loan or loan guarantee to, any corporation that:

- (1) Has any unpaid Federal tax liability that has been assessed, for which all judicial and administrative remedies have been exhausted or have lapsed, and that is not being paid in a timely manner pursuant to an agreement with the authority responsible for collecting the tax liability, where the awarding agency is aware of the unpaid tax liability, unless an agency has considered suspension or debarment of the corporation and made a determination that suspension or debarment is not necessary to protect the interests of the Government; or
- (2) Was convicted of a felony criminal violation under any Federal law within the preceding 24 months, where the awarding agency is aware of the conviction, unless an agency has considered suspension or debarment of the corporation and made a determination that this action is not necessary to protect the interests of the Government.

The Recipient therefore agrees:

1) **Definitions.** For the purposes of this exhibit, the following definitions apply:

**“Covered Transaction”** means a transaction that uses any funds under this award and that is a contract, memorandum of understanding, cooperative agreement, grant, loan, or loan guarantee.

**“Felony Conviction”** means a conviction within the preceding 24 months of a felony criminal violation under any Federal law and includes conviction of an offense defined in a section of the United States Code that specifically classifies the offense as a felony and conviction of an offense that is classified as a felony under 18 U.S.C. 3559.

**“Participant”** means the Recipient, an entity who submits a proposal for a Covered Transaction, or an entity who enters into a Covered Transaction.

**“Tax Delinquency”** means an unpaid Federal tax liability that has been assessed, for which all judicial and administrative remedies have been exhausted, or have lapsed, and that is not being paid in a timely manner pursuant to an agreement with the authority responsible for collecting the tax liability.

2) **Mandatory Check in the System for Award Management.** Before entering a Covered Transaction with another entity, a Participant shall check the System for Award Management (the “SAM”) at <http://www.sam.gov/> for an entry describing that entity.

3) **Mandatory Certifications.** Before entering a Covered Transaction with another entity, a Participant shall require that entity to:

(1) Certify whether the entity has a Tax Delinquency; and

(2) Certify whether the entity has a Felony Conviction.

4. **Prohibition.** If

(1) the SAM entry for an entity indicates that the entity has a Tax Delinquency or a Federal Conviction;

(2) an entity provides an affirmative response to either certification in section 3; or

(3) an entity’s certification under section 3 was inaccurate when made or became inaccurate after being made then a Participant shall not enter or continue a Covered Transaction with that entity unless the USDOT has determined in writing that suspension or debarment of that entity are not necessary to protect the interests of the Government.

5. **Mandatory Notice to the USDOT.**

a) If the SAM entry for a Participant indicates that the Participant has a Tax Delinquency or a Felony Conviction, the Recipient shall notify the USDOT in writing of that entry.

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- b) If a Participant provides an affirmative response to either certification in section 1, the Recipient shall notify the USDOT in writing of that affirmative response.
  - c) If the Recipient knows that a Participant's certification under section 1 was inaccurate when made or became inaccurate after being made, the Recipient shall notify the USDOT in writing of that inaccuracy.
6. **Flow Down.** For all Covered Transactions, including all tiers of subcontracts and subawards, the Recipient shall:
- 1) require the SAM check in section 2;
  - 2) require the certifications in section 3;
  - 3) include the prohibition in section 4; and
  - 4) require all Participants to notify the Recipient in writing of any information that would require the Recipient to notify the USDOT under section 5.

**PROJECT SPECIAL PROVISIONS**

**GEOTECHNICAL**

PILES (ASD)

GT-1.1 - GT-1.10

THERMAL INTEGRITY PROFILER (SPECIAL)

GT-2.1 - GT-2.2

MICROPILE (SPECIAL)

GT-3.1 - GT-3.10

STANDARD SHORING (SPECIAL)

GT-4.1 - GT-4.4

DocuSigned by:

*Geotechnical Engineering Unit*

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**PILES (ASD)****(SPECIAL)****PILES****1 DESCRIPTION**

Furnish and install piles in accordance with the contract and accepted submittals. Provide steel and composite piles with both concrete and steel sections shown in the plans. Drive and drill in piles and use pile tips and accessories as shown in the plans. Galvanize, restrike, re-drive, splice, cut off and build up piles and perform predrilling, spudding and pile driving analyzer testing as necessary or required.

Define "pile embedment" as the required pile embedment in the cap or footing and "pile penetration" as the minimum required pile tip elevation or penetration into natural ground, whichever is deeper. Define "natural ground" as below the ground or mud line before constructing any embankments.

The estimated pile lengths shown in the plans are for bid purposes only. Provide piles of sufficient lengths for the required bearing capacity, pile embedment and pile penetration. Determine required pile lengths by performing subsurface investigations, as needed.

**2 MATERIALS**

Refer to Division 10.

<b>Item</b>	<b>Section</b>
Flowable Fill, Non-Excavatable	1000-6
Neat Cement Grout, Type 1	1003
Portland Cement Concrete, Class A	1000
Reinforcing Steel	1070
Steel and Prestressed Concrete Piles	1084-1
Steel Pipe Pile Plates	1072

For drilled-in piles, use Class A concrete that meets Article 1000-4 except as modified herein. Provide concrete with a slump of 6" to 8". Use an approved high-range water reducer to achieve this slump.

For composite piles with both prestressed concrete and steel H-pile sections, use prestressed concrete piles and steel H-piles that meet Section 1084. Use steel pile points and splicers that are on the NCDOT Approved Products List.

**3 CONSTRUCTION METHODS****(A) Handling and Storing Piles**

Handle, transport and store piles so piles are kept clean and undamaged. Do not use chains, cables or hooks that can damage or scar piles. Do not damage coatings on steel piles. When handling prestressed concrete piles, support piles at pick-up points shown in the plans.

Protect steel piles from corrosion. Store piles above ground upon platform skids, or other supports, and keep free from dirt, grease, vegetation and other foreign material.

**(B) Pile Installation**

If applicable, completely excavate for caps or footings before installing piles. If applicable and unless noted otherwise in the plans, construct embankments to bottom of cap or footing elevations for a horizontal distance of 50 ft from any pile except where fill slopes are within 50 ft of a pile.

Install piles with the following tolerances:

- (1) Axial alignment within 1/4"/ft of vertical or batter shown in the plans,
- (2) Horizontal alignment within 3" of plan location, and
- (3) Pile embedment within 3" more and 2" less of the embedment shown in the plans.

If necessary, build up prestressed concrete piles or splice steel piles as shown in the plans. Do not use more than 3 sections (2 splices) of steel piling per pile. Cut off piles at required elevations along a plane normal to the axis of the pile as necessary. Do not damage or spall piles when cutting off prestressed concrete piles.

**(C) Pile Accessories**

When required, use pile accessories including pipe pile plates and steel pile points and splicers shown in the plans. Weld pipe pile plates to steel pipe piles as shown in the plans.

Attach steel pile points to steel piles in accordance with the manufacturer's instructions. Weld a minimum length of twice the flange width for steel H-piles.

Use steel pile tips with prestressed concrete piles as shown in the plans. Use steel pile splicers for splicing steel H-pile tips and composite piles. Attach steel pile splicers in accordance with the manufacturer's instructions.

**(D) Driven Piles**

Do not drive piles within 50 ft of cast-in-place concrete until the concrete cures for at least 3 days. Do not use vibratory hammers to install prestressed concrete piles.

When predrilling, spudding and installing the initial portions of steel piles with vibratory hammers, submit these pile installation methods with the proposed pile driving methods and equipment for acceptance. Define "spudding" as driving or dropping a steel H-pile and then removing it. The Engineer will approve the spudding depth and H-pile size, predrilling depth and diameter and depth of pile installation with a vibratory hammer.

Limit driving stresses in accordance with the AREMA Manual for Railway Engineering. If a tip elevation is noted in the plans, drive steel to the minimum required driving criteria and tip elevation. Otherwise, drive steel to the minimum required driving criteria and at least 10 ft into natural ground. Drive composite piles to the minimum required driving criteria and the prestressed concrete and steel H-pile sections to their respective minimum required tip elevations noted in the plans.



Drive piles continuously to the required pile penetration unless stopped due to exceeding the maximum blow count or driving stresses, insufficient pile length or other approved reasons. Redrive piles raised or moved laterally due to driving adjacent piles.

Protect coatings in an approved manner when driving coated steel piles through templates. Repair damaged galvanizing in accordance with Article 1076-4.

(1) Predrilling and Spudding

If necessary or required, perform predrilling and spudding as noted in the plans and in accordance with the accepted submittals. Predrill pile locations to elevations noted in the plans or approved by the Engineer. When noted in the plans and at the Contractor's option, spudding may be used instead of predrilling. Do not perform spudding below predrilling elevations noted in the plans or approved by the Engineer.

When noted in the plans or predrilling in water or wetlands, use temporary steel casings that meet Subarticle 3(E)(1), except use steel casings with inside diameters no more than 2" larger than predrilling diameters. Use temporary casings from at least 2 ft above the static water elevation or ground line, whichever is higher, to at least 5 ft below the ground or mud line. More than 5 ft embedment may be necessary if temporary casings are not stable or predrilling or spudding disturbs material outside casings.

Perform predrilling and spudding so spoils are minimized, large ground movements and voids below ground do not occur and piles can be driven to the required bearing capacity and pile penetration. Do not deposit spoils in water or wetlands. Remove all temporary casings before driving piles.

(2) Driving Equipment

Submit the proposed pile driving methods and equipment (pile driving equipment data form) including the pile driving hammer, hammer cushion, pile helmet and cushion for all piles for acceptance. Do not submit more than 2 pile driving hammers per pile type per submittal. Provide 2 copies of each data form at least 30 days before driving piles. All equipment is subject to satisfactory field performance.

Drive piles with accepted driving equipment and operate pile driving hammers in accordance with the manufacturer's recommendations. Use hammers that will not overstress piles and attain the required bearing capacity between 30 and 180 blows/ft. Use variable energy hammers to drive prestressed concrete piles.

Operate air and steam hammers within 10% of the manufacturer's rated speed or a rate approved by the Engineer. Use a plant and equipment for air or steam hammers with sufficient capacity to maintain, under working conditions, the manufacturer's recommended volume and pressure. Equip the plant and equipment with accurate pressure gauges that are easily accessible. Provide striking parts of air and steam hammers weighing at least 2,750 lb and one-third the pile helmet and pile weight.

Equip open-end (single acting) diesel hammers with a graduated scale (jump stick) extending above the ram cylinder, graduated rings or grooves on the ram or an electric sound activated remote measuring instrument to determine the hammer stroke during driving. Equip closed-end (double acting) diesel hammers with a calibrated bounce chamber pressure gauge mounted near the ground and provide a current calibrated chart or graph equating bounce chamber pressure and gauge hose length to equivalent energy. Submit this chart or graph with the proposed pile driving methods and equipment for closed-end diesel hammers.

The Engineer may inspect the hammer cushion before beginning and occasionally during driving. Expose the hammer cushion for inspection as directed. Replace or repair any hammer cushion that is less than 25% of its original thickness.

Hold pile heads in position with pile helmets that closely fit over pile heads and extend down the sides of piles a sufficient distance. Protect pile heads of prestressed concrete piles from direct impact with accepted pile cushions. Use pile cushions made of pine plywood with a thickness of at least 4". Provide a new pile cushion for each prestressed concrete pile. Replace pile cushions during driving when a cushion is compressed more than 50% of its original thickness or begins to burn.

(3) Pile Driving Criteria

The Engineer will determine if the proposed pile driving methods and equipment are acceptable and provide the blows/ft and equivalent set for the required bearing capacity noted in the plans, i.e., "pile driving criteria" except for structures with pile driving analyzer (PDA) testing. For structures with PDA testing, provide pile driving criteria for any bents and end bents with piles in accordance with Subarticle 3(F)(4).

Stop driving piles when refusal is reached. Define "refusal" as 240 blows/ft or any equivalent set.

(4) Restriking and Redriving Piles

After reaching the required pile penetration, the Contractor may choose to or the Engineer may require the Contractor to stop driving, wait and restrike or redrive piles to attain the required bearing capacity. When the Engineer requires restrikes or redrives, the Engineer will determine the number of restrikes or redrives and the time to wait after stopping driving and between restrikes and redrives. The time to wait will range from 4 to 24 hours.

Use the same pile driving methods, equipment and compressed pile cushion from the previous driving to restrike or redrive piles unless the cushion is unacceptable due to deterioration. Do not use cold diesel hammers for restrikes or redrives, unless it is impractical to do otherwise as determined by the Engineer. In general, warm up hammers by applying at least 20 blows to a previously driven pile or timber mats on the ground.

**(E) Drilled-in Piles**

Perform pile excavation to elevations shown in the plans or approved by the Engineer. Excavate holes at pile locations with diameters that will result in at least 3" of clearance all around piles. Before filling holes, support and center piles in excavations and when noted in the plans, drive piles to the required driving criteria. Remove any fluids from excavations and, at the Contractor's option, fill holes with concrete, grout or flowable fill unless required otherwise in the contract.

**(1) Pile Excavation**

Use equipment with sufficient capacity to drill through soil, rock, boulders, timbers, man-made objects and any other materials encountered. Do not use blasting to advance pile excavations. Blasting for core removal is only permitted when approved by the Engineer. Contain and dispose of drilling spoils as directed and in accordance with Section 802. Drilling spoils consist of all materials and fluids removed from pile excavations.

If unstable, caving or sloughing soils are anticipated or encountered, use slurry or temporary steel casings to stabilize holes. When using slurry, submit slurry details including product information and additives, manufacturer's recommendations for use, slurry equipment details and documentation that mixing water is suitable for slurry before beginning drilling. When using temporary casings, use smooth non-corrugated clean watertight steel casings of ample strength to withstand handling and installation stresses and pressures imposed by concrete, earth, backfill and fluids. Use steel casings with an outside diameter equal to the hole size and a wall thickness of at least 1/4".

**(2) Filling Holes**

Check the water inflow rate at the bottom of holes after all pumps have been removed. If the water inflow rate is greater than 6" per half hour or holes are stabilized with slurry, use an approved method for placing concrete, grout or flowable fill. Otherwise, remove any fluids and free fall concrete, grout or flowable fill into holes. Ensure that concrete, grout or flowable fill flows completely around piles. Place concrete, grout or flowable fill continuously and remove all temporary casings.

**(F) Pile Driving Analyzer**

When required, test piles in accordance with ASTM D4945 using a pile driving analyzer (PDA) manufactured by Pile Dynamics, Inc. Analyze PDA data with the CAse Pile Wave Analysis Program (CAPWAP) manufactured by Pile Dynamics, Inc. Use a prequalified PDA Consultant to perform PDA testing and CAPWAP analyses and provide PDA reports. Use a PDA Operator approved as a Field Engineer (key person) for the PDA Consultant. Provide PDA reports sealed by an engineer approved as a Project Engineer (key person) for the same PDA Consultant.

The Engineer will determine how many and which piles require PDA testing. Provide piles

for PDA testing that are at least 5 ft longer than the estimated pile lengths shown in the plans. Do not drive piles until the proposed pile driving methods and equipment have been preliminarily accepted. Notify the Engineer of the pile driving schedule at least 7 days in advance.

The Engineer will complete the review of the proposed pile driving methods and equipment within 7 days of receiving PDA reports and pile driving criteria. Do not place concrete for caps or footings on piles until PDA reports and pile driving criteria have been accepted.

(1) PDA Testing

If necessary, provide a shelter to protect the PDA Operator and equipment from conditions of sun, water, wind and temperature. The shelter should have a floor size of at least 6 ft x 6 ft and a roof height of at least 8 ft. If necessary, heat or cool the shelter to maintain a temperature between 50°F and 85°F. Place the shelter within reach of the PDA cables and clear view of piles being driven.

Drill holes for PDA instruments as directed. Place piles in leads and templates before attaching PDA instruments. Use only preliminarily accepted pile driving methods and equipment to drive piles. Drive piles as directed and in accordance with Subarticle 3(D). The PDA Operator or Engineer may require modified pile installation procedures during driving. Dynamic measurements will be recorded and used to evaluate the hammer performance, bearing capacity, driving stresses, energy transfer, pile integrity and various soil parameters such as quake and damping.

If required, reattach PDA instruments and restrike or redrive piles in accordance with Subarticle 3(D)(4). Obtain the required stroke and at least 6" of pile movement as directed. Dynamic measurements will be recorded during restriking and re-driving. The Engineer will determine when PDA testing has been satisfactorily completed

(2) CAPWAP Analysis

CAPWAP analysis is required for at least a hammer blow near the end of initial drive and each restrike and redrive. Additional CAPWAP analyses may be required as determined by the PDA Consultant or Engineer.

(3) PDA Reports

Submit 2 copies of each PDA report within 7 days of completing PDA testing. Include the following in PDA reports:

(a) Title Sheet

- (i) Department's TIP number and WBS element number
- (ii) Project description
- (iii) County

- (iv) Bridge station number
- (v) Pile location
- (vi) Personnel
- (vii) Report date
- (b) Introduction
- (c) Site and Subsurface Conditions (including water table elevation)
- (d) Pile Details (including driving dates and times)
  - (i) Pile type and length
  - (ii) Required bearing capacity and safety factor
  - (iii) Concrete compressive strength or steel yield strength
  - (iv) Pile splice type and locations
  - (v) Pile batter
  - (vi) Installation methods including use of predrilling, spudding, vibratory hammer, template, barge, etc.
- (e) Driving Details
  - (i) Hammer make, model and type
  - (ii) Hammer and pile cushion type and thickness
  - (iii) Pile helmet weight
  - (iv) Hammer efficiency and operation data including fuel settings, bounce chamber pressure, blows per minute, equipment volume and pressure
  - (v) Driving data (ram stroke, blows/ft and set for last 10 hammer blows)
  - (vi) Ground or mud line, template reference and final pile tip elevations
  - (vii) Restrike and redrive information
- (f) PDA Field Work Details
- (g) CAPWAP Analysis Results
  - (i) Table showing percent skin and tip, skin and toe damping, skin and toe quake and match quality
- (h) Summary/Conclusions
- (i) Attachments
  - (i) Boring log(s)
  - (ii) Pile driving equipment data form (from Contractor)

- (iii) Field pile driving inspection data (from Engineer)
- (iv) Accelerometer and strain gauge serial numbers, calibration and locations
- (v) PDA hardware model and CAPWAP software version information
- (vi) PDF copy of all PDA data and executable CAPWAP input and output files

(4) Pile Driving Criteria

Analyze pile driving with the GRL Wave Equation Analysis Program (GRLWEAP) manufactured by Pile Dynamics, Inc. Use the same PDA Consultant that provides PDA reports to perform GRLWEAP analyses and develop pile driving criteria. Provide driving criteria sealed by an engineer approved as a Project Engineer (key person) for the same PDA Consultant.

Analyze pile driving so driving stresses, energy transfer, ram stroke and blows/ft from PDA testing and capacities from CAPWAP analyses correlate to GRLWEAP models. Provide pile driving criteria for each combination of required bearing capacity and pile length installed for all pile types and sizes. Submit 2 copies of pile driving criteria with PDA reports. Include the following for driving criteria:

- (a) Project information in accordance with Subarticle 3(F)(3)(a)
- (b) Table showing blows/ft and equivalent set vs. either stroke for multiple strokes in increments of 6" or bounce chamber pressure for multiple pressures in increments of 1 psi
- (c) Maximum stroke or blows/ft or pile cushion requirements to prevent overstressing piles as needed
- (d) GRLWEAP software version information
- (e) PDF copy of all pile driving criteria and executable GRLWEAP input and output files

#### 4 MEASUREMENT AND PAYMENT

No additional payment will be made for subsurface investigations to determine required pile lengths or larger caps or footings due to piles out of position.

*Pile Driving Equipment Setup for \_\_\_\_ Steel Piles* will be measured and paid in units of each. Setting up equipment to drive piles will be measured as one per pile. No payment will be made for pile driving equipment setup for installed piles that are not driven. The contract unit price for *Pile Driving Equipment Setup for \_\_\_\_ Steel Piles* will be full compensation for mobilizing and demobilizing pile driving equipment, personnel, supplies and incidentals, setting up and breaking down pile driving equipment, e.g., pile hammer, crane, template, etc. and submitting the proposed pile driving methods and equipment.

\_\_\_\_ *Steel Piles* will be measured and paid in linear feet. Steel will be measured as the pile length

before installation minus any pile cut-offs. No payment will be made for pile cut-offs or cutting off piles. No payment will be made for damaged, defective or rejected piles or any piles for falsework, bracing, templates or temporary work bridges. The contract unit prices for \_\_\_ *Steel Piles* will be full compensation for driving piles.

After piles attain the required bearing capacity and pile penetration and at the Contractor's option, drive piles to grade instead of cutting off piles provided the remaining portions of piles do not exceed 5 ft and piles can be driven without damage or reaching the maximum blow count or refusal. When this occurs, the additional pile length driven will be measured and paid at the contract unit prices for \_\_\_ *Steel Piles*.

*Steel Pile Points* will be measured and paid in units of each. *Steel Pile Points* will be measured as one per pile.

*Predrilling for Piles* will be measured and paid in linear feet. For bents with a predrilling pay item shown in the plans, predrilling will be paid as *Predrilling for Piles* and measured per pile location as the depth from the ground or mud line to the specified predrilling elevation or revised elevation approved by the Engineer. The contract unit price for *Predrilling for Piles* will also be full compensation for using temporary casings. For bents without a predrilling pay item shown in the plans, predrilling will be incidental to the contract unit prices for \_\_\_ *Steel Piles*.

No direct payment will be made for spudding. Spudding will be incidental to the contract unit prices for \_\_\_ *Steel Piles*.

*Pile Redrives* will be measured and paid in units of each. *Pile Redrives* will be measured as the number of restrikes or redrives required by the Engineer. No payment will be made for restrikes or redrives when the Contractor chooses to restrike or redrive piles.

*Pile Excavation in Soil* and *Pile Excavation Not in Soil* will be measured and paid in linear feet. Pile excavation will be measured as the depth from the ground line to the specified pile excavation elevation or revised elevation approved by the Engineer. Define "not in soil" as material with a rock auger penetration rate of less than 2" per 5 minutes of drilling at full crowd force. When not in soil is encountered, seams, voids and weathered rock less than 3 ft thick with a rock auger penetration rate of greater than 2" per 5 minutes of drilling at full crowd force will be paid at the contract unit price for *Pile Excavation Not in Soil*. Seams, voids and weathered rock greater than 3 ft thick will be paid at the contract unit price for *Pile Excavation in Soil* where not in soil is no longer encountered. The contract unit prices for *Pile Excavation in Soil* and *Pile Excavation Not in Soil* will be full compensation for stabilizing and filling holes with concrete, grout or flowable fill.

*PDA Testing* will be measured and paid in units of each. *PDA Testing* will be measured as one per pile. The contract unit price for *PDA Testing* will be full compensation for performing PDA testing the first time a pile is tested, performing CAPWAP analysis on data collected during initial drive, restrikes and redrives, providing PDA reports, performing GRLWEAP analysis and developing and providing pile driving criteria. Subsequent PDA testing of the same piles will be incidental to the contract unit price for *Pile Redrives*. The contract unit price for *PDA Testing* will also be full compensation for the Contractor's assistance to perform PDA testing during initial drive, restrikes and redrives.

Payment will be made under:

**Pay Item**

- Pile Driving Equipment Setup for \_\_\_\_ Steel Piles
- \_\_\_\_ Steel Piles
- Steel Pile Points
- Predrilling for Piles
- Pile Excavation in Soil
- Pile Excavation Not in Soil
- PDA Testing

**Pay Unit**

- Each
- Linear Foot
- Each
- Linear Foot
- Linear Foot
- Linear Foot
- Each



DocuSigned by:  
*Shane C. Clark*  
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**GT-2.1**

Mecklenburg County

**THERMAL INTEGRITY PROFILER****(SPECIAL-REV1-18)****1.0 GENERAL**

Perform the nondestructive testing (NDT) method termed Thermal Integrity Profiler (TIP) testing by obtaining records of the heat generated by curing cement (hydration energy) to assess the quality of drilled piers. TIP measurements that are colder than normal indicate necks, inclusions, or poor quality concrete, while warmer than normal measurements are indicative of bulges. Variations of temperatures between tubes reveal cage eccentricity. Furnish all materials, equipment, and labor necessary to conduct TIP testing on production and demonstration drilled piers. The TIP testing will meet the requirements of ASTM D 7949, except as noted below.

**2.0 EQUIPMENT**

Supply all materials and equipment required to perform TIP tests. Equipment to perform the test shall have the following minimum requirements:

- A. (Probe or wire option) A computer based TIP data acquisition system for (a) display of signals during data acquisition (probe option only), or (b) to monitor temperature versus time after casting (wire option only).
- B. (Probe option only) Thermal probe infrared sensors equally spaced around the perimeter that read temperatures of the tube wall to within 1°F accuracy. The probes shall be less than 1.25 inches in diameter and shall freely descend through the full depth of properly installed access tubes in the drilled piers; One depth encoder sensor to determine probe depths; Ability to collect data at user specified depth increment; Thermal Probe access points will correspond to CSL tube locations.
- C. (Wire option only) Ability to collect data at user defined time intervals (typically 15 to 60 minutes). If embedded sensors are used, install the same number of sensor strings as the number of CSL tubes.

**3.0 TESTING PROCEDURE.** Conform to testing procedures in ASTM D 7949 specification.

**4.0 RESULT REPORTING**

Submit a written report within (5) working days of completion of testing. The report shall present results of TIP tests by including:

- A. Graphical displays of all temperature measurements (probes or wires) versus depth
- B. Indication of unusual temperatures, particularly significantly cooler local deviations of the average at any depth from the overall average over the entire length, in either probe or thermal wire measurements
- C. The overall average temperature. This temperature is proportional to the average radius computed from the actual total concrete volume installed (assuming a consistent concrete mix throughout). Radius at any point can then be determined from the temperature at that point compared to the overall average temperature.

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**GT-2.2**

Mecklenburg County

- D. Variations in temperature between tubes (at each depth) which in turn correspond to variations in cage alignment. Where concrete volume is known, the cage alignment or offset from center should be noted.
- E. Where pier specific construction information is available (e.g. elevations of the top of pier, bottom of casing, bottom of pier, etc.), these values should be noted on all pertinent graphical displays.

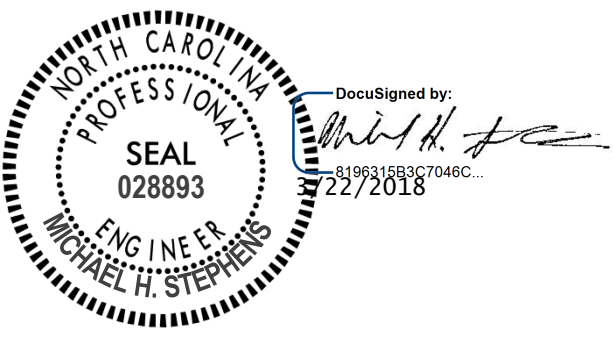
**5.0 MEASUREMENT AND PAYMENT**

TIP testing will be measured by each successful test that is approved by the Engineer. Quantities of TIP testing will be shown on the plans.

The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit price bid for each "Thermal Integrity Profiler (TIP) Testing of Drilled Pier" of size and type specified. This price is full compensation for material, equipment, labor, work, tools, and incidentals.

Payment will be made under:

<b>Pay Item</b>	<b>Pay Unit</b>
Thermal Integrity Profiler	Each



**MICROPILES****(SPECIAL)****MICROPILES****1.0 GENERAL**

A micropile is a small diameter, drilled and grouted non-displacement pile with a reinforcing casing and typically a center reinforcing bar. Load testing is required when noted in the plans. Design and construct micropiles with the required resistance in accordance with the contract and accepted submittals. Use a prequalified Micropile Subcontractor for micropile work. Define “pile” as a micropile.

**2.0 SUBMITTALS**

Three submittals are required. These submittals include (1) Micropile Subcontractor personnel and experience, (2) micropile design and (3) micropile installation and testing plan. Provide 4 copies and a PDF copy of each submittal. Allow 10 days for the review of the Micropile Subcontractor personnel and experience submittal. After the personnel and experience submittal is accepted, submit the remaining submittals at least 30 days before starting micropile construction. Do not begin micropile construction until the installation and testing plan is accepted.

**A. Micropile Subcontractor Personnel and Experience Submittal**

Submit documentation that the Micropile Subcontractor has successfully completed at least 5 micropile projects and 250 micropiles within the last 3 years with micropile diameters and lengths similar to those anticipated for this project. Documentation should include the General Contractor and Owner’s name and current contact information with descriptions of each past project. Also, submit documentation of experience with micropile load testing and construction in subsurface conditions similar to those for this project.

Provide verification of employment with the Micropile Subcontractor for the Superintendent and Project Manager assigned to this project. Submit documentation that these personnel each have at least 5 years of experience in micropile construction with past projects of scope and complexity similar to that anticipated for this project. Documentation should include resumes, references, certifications, project lists, experience descriptions and details, etc. Use accepted personnel to construct micropiles. If personnel changes are required during construction, suspend micropile construction until replacement personnel are accepted.

A Design Engineer is required to design the micropiles. Submit documentation that the Design Engineer is licensed by the State of North Carolina and has at least 5 years of experience in designing micropiles with capacities and in subsurface conditions similar to those for this project. Documentation should include resumes, references,

certifications, project lists, experience descriptions and details, etc. The Design Engineer may also act as the Project Manager provided the Design Engineer meets the Project Manager requirements above.

#### B. Micropile Design Submittal

The micropile layout, inclination, minimum reinforcing casing, pile to cap/footing connection, top of micropile elevation and resistances are shown in the plans. Verify existing site conditions and survey information before designing micropiles.

Design micropiles in accordance with the *FHWA Micropile Design and Construction Guidelines* unless otherwise required. Define “bond length” as the micropile length below the reinforcing casing tip elevation noted in the plans. Determine the bond length and reinforcement for the factored resistance noted in the plans. A bond length of at least 10 ft is required. If verification load testing is required, use a resistance factor of 0.60 for axial compression and uplift resistance. Otherwise, use a resistance factor of 0.55. When using tension load tests to determine nominal grout-to-ground bond resistances for axial compression resistance, neglect tip resistance.

Either extend the reinforcing casing below the required tip elevation or use a center reinforcing bar for reinforcement. Extend the bar or casing full length of the pile and provide a grout cover of at least ½ inch outside the casing. Design and locate reinforcing casing joints as shown in the plans.

Submit working drawings and design calculations including estimated unit nominal resistances for acceptance in accordance with Article 105-2 of the *Standard Specifications*. Include all dimensions, quantities, elevations and cross-sections necessary to construct the micropiles. Have piles designed, detailed and sealed by the Design Engineer. When design changes occur due to load test results, varying site conditions or other reasons, a revised micropile design submittal is required.

#### C. Micropile Installation and Testing Plan Submittal

Provide detailed project specific information in the installation and testing plan that includes the following:

1. List and sizes of proposed equipment including micropile drilling rigs and tools, tremies and grouting equipment;
2. Sequence of micropile construction and step-by-step description of micropile installation including details of casing installation, drilling methods and flushing;
3. List of reinforcement including grades or yield strength and sizes;
4. Methods for placing reinforcement with procedures for supporting and positioning the reinforcement including centralizers;
5. Procedures for placing grout including how the grout will be initially placed in drill holes and acceptable ranges for grout pressures and volumes;

6. Equipment and procedures for monitoring and recording grout levels, pressures and volumes with calibration certificates dated within 90 days of the submittal date;
7. Examples of construction records to be provided that meet Section 8.0 of this provision;
8. Procedures for containment and disposal of drilling spoils, drill flush and waste grout;
9. Approved packaged grout or grout mix design with acceptable ranges for flow and density that meets Section 1003 of the *Standard Specifications*;
10. If load testing is required, load testing details, procedures and plan sealed by the Design Engineer or Project Engineer for the Load Test Supplier with calibration certificates dated within 90 days of the submittal date;
11. Load Test Supplier, when applicable, including Project Engineer; and
12. Other information shown in the plans or requested by the Engineer.

If alternate installation and testing procedures are proposed or necessary, a revised installation and testing plan submittal may be required. If the work deviates from the accepted submittal without prior approval, the Engineer may suspend micropile construction until a revised plan is accepted.

### 3.0 MATERIALS

Refer to the *Standard Specifications*.

<b>Item</b>	<b>Section</b>
Neat Cement Grout, Type 2	1003

#### A. Reinforcement

Provide a Type 1 material certification that meets Article 106-3 of the *Standard Specifications* for reinforcing casings and bars. Store steel reinforcement on blocking at least 12 inches above the ground and protect it at all times from damage; and when placing in the work make sure it is free from dirt, dust, loose mill scale, loose rust, paint, oil or other foreign materials.

##### 1. Reinforcing Casings

Reinforcing casings will be new "Structural Grade" steel pipe free from dents, cracks, cuts or any other defects provided the steel meets Subarticle 106-1(B) of the *Standard Specifications*. Use steel casings with the minimum wall thickness shown in the plans and outside diameters ranging from the minimum shown in the plans to 3 inches larger. Provide casings that meet ASTM A252, Grade 3 unless noted otherwise in the plans. When reinforcing casings with a higher strength than Grade 3 are required, the elongation requirements in ASTM A252 do not apply to casings. For testing casings, define a "lot" as each truckload delivered and 2 samples and tests are required per lot.

## 2. Reinforcing Bars

Use deformed steel bars that meet AASHTO M 275 or M31, Grade 60 or 75. Splice reinforcing bars in accordance with Article 1070-9 of the *Standard Specifications*. Locate reinforcing casing joints at least 2 ft from bar splices.

## B. Centralizers

Fabricate bar centralizers from schedule 40 PVC plastic pipe or tube, steel or other material not detrimental to steel reinforcement (no wood). Size centralizers to position reinforcement within 1 inch of drill hole centers and allow tremies to be inserted to ends of holes. Use centralizers that do not interfere with grout placement or flow around reinforcement.

## 4.0 CORROSION PROTECTION

Galvanize exposed reinforcing casings in accordance with Section 1076 of the *Standard Specifications*. After installing piles, clean exposed galvanized surfaces of casings with a 2,500 psi pressure washer. Apply organic zinc repair paint to exposed casing joints and repair damaged galvanized surfaces that are exposed in accordance with Article 1076-7 of the *Standard Specifications*.

## 5.0 DEMONSTRATION MICROPILES

When shown in the plans or as directed, construct demonstration micropiles in accordance with the accepted submittals and this provision. The inclination, minimum reinforcing casing and locations of demonstration micropiles are shown in the plans. Install demonstration micropiles to the depth of the longest pile on the project or the length required for verification load tests.

The purpose of demonstration piles is to demonstrate the Micropile Subcontractor's ability to successfully install micropiles. The demonstration micropile results will be used to evaluate the grout mix design and possibly revise acceptable ranges for grouting pressures established with the micropile installation and testing plan. If load testing is required for a demonstration micropile, the results will be used to evaluate the micropile design including estimated unit nominal resistances.

The Engineer will determine if demonstration micropiles are satisfactory or not within 24 hours of receiving the demonstration pile construction records that meet Section 8.0 of this provision. If the Engineer determines a demonstration micropile is unsatisfactory, a replacement pile is required at no additional cost to the Department. Do not begin construction of any production micropiles until all demonstration piles are accepted in accordance with Section 10.0 of this provision.

## 6.0 PRECONSTRUCTION MEETING

Before starting micropile construction, hold a preconstruction meeting to discuss the

installation, monitoring and testing of the piles. Schedule this meeting after the Micropile Subcontractor mobilizes to the site. If this meeting occurs before all micropile submittals have been accepted, additional preconstruction meetings may be required before beginning construction of micropiles without accepted submittals. The Resident or Bridge Maintenance Engineer, Bridge Construction Engineer, Geotechnical Operations Engineer, Contractor and Micropile Subcontractor Superintendent and Project Manager will attend preconstruction meetings.

## 7.0 CONSTRUCTION METHODS

Use equipment and methods accepted in the micropile installation and testing plan or approved by the Engineer. Inform the Engineer of any deviations from the accepted plan. Install production micropiles in the same way as satisfactory demonstration micropiles, if applicable.

Dispose of drilling spoils, drill flush and waste grout as directed and in accordance with Section 802 of the *Standard Specifications*. Drilling spoils consist of all excavated material and fluids removed from drill holes.

Control drilling and grouting to prevent excessive ground movements, damaging structures and fracturing rock and soil formations. If ground heave or subsidence occurs, suspend micropile construction and take action to minimize movement. If structures are damaged, suspend micropile construction and repair structures with an approved method at no additional cost to the Department. The Engineer may require a revised micropile installation and testing plan when corrective action is necessary.

### A. Drilling and Reinforcement

Use micropile drilling rigs capable of drilling through whatever materials are encountered to the dimensions and elevations required for the micropile design. Install piles with tip elevations no higher than shown in the accepted submittals or approved by the Engineer.

Do not install reinforcing casings or begin drilling within 6 pile diameters, center to center, or 5 ft, whichever is greater, of completed micropiles until grout in piles reaches initial set. More clearance may be necessary if micropile construction affects adjacent micropiles.

Install reinforcing casings to a tip elevation no higher than that noted in the plans. Also, when noted in the plans, install reinforcing casings with a penetration of at least 5 ft into rock as determined by the Engineer. Construct reinforcing casing joints in accordance with the accepted submittals. Special welding procedures are required for steel with yield strength greater than 50 ksi.

Use drilling methods that result in the annulus between reinforcing casings and the ground filled with grout. Check for correct micropile location and plumbness or proper

inclination before beginning drilling. Stabilize drill holes with casings from beginning of drilling through grouting if unstable material is anticipated or encountered. After drilling, flush drill holes with water or air to remove drill cuttings and other loose materials.

Use centralizers to center reinforcement in drill holes. Securely attach bar centralizers at maximum 10 ft intervals along reinforcing bars. Attach upper and lowermost centralizers 5 ft from the top and bottom of micropiles.

Place reinforcing bars before grouting or after while grout is still fluid. Do not vibrate or drive reinforcement. Reinforcing bars may be gently pushed into grout. If reinforcement can only be partially inserted, redrill or clean drill holes to permit complete insertion.

#### B. Grouting

Remove oil, rust inhibitors, residual drilling fluids and similar foreign materials from holding tanks/hoppers, stirring devices, pumps, lines, tremie pipes and all other equipment in contact with grout before use. Size grouting equipment to grout each micropile in one continuous operation. Field calibrate grout pumps at the beginning of construction.

Measure grout temperature, density and flow during grouting with at least the same frequency grout cubes are made for compressive strength. Perform density and flow field tests in the presence of the Engineer in accordance with American National Standards Institute/American Petroleum Institute Recommended Practice 13B-1 (Section 4, Mud Balance) and ASTM C939 (Flow Cone), respectively.

Grout micropiles the same day the bond length is drilled and do not leave drill holes open overnight. Place grout with a tremie in accordance with the contract and accepted submittals until uncontaminated grout flows from the top of the micropile. Extend tremie pipe into grout at least 5 ft at all times except when grout is initially placed in drill holes. Provide grout free of segregation, intrusions, contamination, structural damage or inadequate consolidation (honeycombing).

Monitor and record grout levels, pressures and volumes during placement. To monitor grout pressure, use pumps equipped with a pressure gauge and locate a second pressure gauge at the point of injection into the drill hole. Use pressure gauges that can measure pressures of at least 150 psi or twice the actual grout pressures, whichever is greater.

### 8.0 CONSTRUCTION RECORDS

Provide 2 copies of micropile construction records within 24 hours of completing each pile. Include the following in construction records:

1. Names of Micropile Subcontractor, Superintendent, Drill Rig Operator, Project Manager and Design Engineer;



2. Bridge description, county, Department's contract, TIP and WBS element number;
3. Abutment station and number, micropile location and identifier and required resistance;
4. Micropile diameters, length and tip elevation and top of micropile and ground surface elevations;
5. Reinforcement types, grades or yield strength, sizes and elevations;
6. Date and time drilling begins and ends, reinforcement is placed, grout is mixed and arrives on-site and grout placement begins and ends;
7. Grout level, pressure, volume, temperature, flow and density records;
8. Ground and surface water conditions and elevations;
9. Weather conditions including air temperature at time of grout placement; and
10. All other pertinent details related to micropile construction.

After completing micropiles for each structure or stage of a structure, provide a PDF copy of all corresponding construction records.

## **9.0 LOAD TESTING**

When noted in the plans, load test micropiles in accordance with the accepted submittals, this provision and the plans. The piles to be tested are shown in the plans or as directed. "Verification tests" are performed on demonstration micropiles and "proof tests" are performed on micropiles incorporated into the structure, i.e., production micropiles based on test piles acceptable in accordance with Section 10.0 of this provision.

When using a Load Test Supplier, use a prequalified Load Test Supplier for foundation testing work. Provide load test reports sealed by an engineer approved as a Project Engineer (key person) for the Load Test Supplier.

Do not load test micropiles until grout attains the required 28 day compressive strength. Do not begin construction of any production micropiles until verification tests are satisfactorily completed. For proof tests, install only the test piles and those micropiles needed to anchor the reaction frame, if applicable. Do not install the remaining micropiles for the bent until the corresponding test piles are satisfactory.

Design test piles so that applied loads do not exceed 80% of the pile's structural resistance including steel yielding or buckling or grout failing. It may be necessary to design test piles with additional reinforcement to allow for higher applied loads. Use a center reinforcing bar for tension load tests when the reinforcement design for production micropiles does not include one. Any costs associated with additional test pile reinforcement will be considered incidental to the load test pay items.

If reinforcement design for production micropiles does not include a center reinforcing bar, tension load tests are required. Otherwise, test micropiles in either compression or tension at the Contractor's option. Perform static compression load tests in accordance with ASTM

D1143 and static tension load tests in accordance with ASTM D3689 except as modified herein.

Set up test equipment and measuring devices so that resetting or repositioning the components before completing testing is not required. Do not apply loads with known weights; a reaction frame and a hydraulic jack are required. Use reaction piles or cribbing and a frame with sufficient strength to prevent excessive deformation, misalignment or racking under peak loading. Do not use existing structures as part of the reaction frame.

Incremental strain measurements are required for all load tests. Use at least one strain gauge at the tip of the test pile and the top of the bond length. Use a calibrated pressure gauge and load cell with the hydraulic jack for verification tests. Provided the same pressure gauge and hydraulic jack are used for proof tests, a load cell is not required for proof tests. Repump jack as needed to maintain the intended load during hold times.

Use the quick load test method in accordance with ASTM D1143 or D3689. For proof tests, load test micropiles to the test loads shown in the accepted submittals. For verification tests, load test piles to at least the test loads shown in the accepted submittals, hold the test loads for 60 minutes and record measurements at 1, 2, 3, 5, 6, 10, 20, 30, 50 and 60 minutes.

At the Contractor's option, use rapid load tests (RLT) such as the Statnamic test (Applied Foundation Testing, Inc.) or dynamic load tests (DLT) such as the APPLE test (GRL Engineers, Inc.) instead of static load tests. Use a Load Test Supplier to perform RLT or DLT. Perform RLT or DLT in accordance with the Load Test Supplier's recommendations and the accepted micropile installation and testing plan. The DLT method is described in ASTM D4945.

For demonstration micropiles, cut off piles 2 ft below the ground surface when testing is complete.

Submit 3 copies and a PDF copy of each load test report within 7 days of completing load testing. Submit reports sealed by the same engineer that sealed the load testing details, procedures and plan in the accepted micropile installation and testing plan. Provide load test reports that meet ASTM D1143, D3689 or the Load Test Supplier's recommendations. Also, include load versus movement curves for the top of micropile and pile tip.

For static compression load tests, use Davisson's failure criteria in accordance with the *FHWA Design and Construction of Driven Pile Foundations, Vol. II* (Publication No. FHWA-NHI-05-043). For this method, define the failure load as the load corresponding to a movement which exceeds the elastic deformation of the micropile by 0.15 inches plus the micropile diameter divided by 120. For static tension load tests, use the failure criteria recommended in Section 18.8.3 of the *FHWA Design and Construction of Driven Pile Foundations, Vol. II*. For this method, define the failure load as the load at which the load-movement curve intersects the elastic lengthening of the micropile plus 0.15 inches. For calculating elastic deformation, the micropile length is the total pile length minus half the bond length.

The Engineer will review the load test report and associated construction records to determine if results are satisfactory within 7 days of receiving the report.

## 10.0 MICROPILE ACCEPTANCE

Micropile acceptance is based in part on the following criteria.

1. Grout pressures, volumes, flow and densities are within acceptable ranges. Grout is properly placed and does not have any evidence of segregation, intrusions, contamination, structural damage or inadequate consolidation (honeycombing).
2. Micropile is within 3 inches of plan location and 2% of plumb or required inclination. Top of micropile is within 1 inch above and 3 inches below the top of micropile elevation shown in the plans.
3. Reinforcement is properly placed and inclination and top of reinforcement is within tolerances for the micropile. Center of reinforcement is within  $\frac{3}{4}$  inches of the center of the micropile. Tip of reinforcing casing is no higher than that noted in the plans and casing penetrates rock at least 5 ft (1.5 m) when noted in the plans.
4. Micropile is satisfactory based on results of load testing, when applicable.

If the Engineer determines a micropile is unacceptable or unsatisfactory, additional testing, remedial measures or replacement micropiles are required at no additional cost to the Department. Do not begin remediation work until remediation plans are approved. No compensation will be made for losses or damages for remedial work or investigation of unacceptable or unsatisfactory micropiles.

## 11.0 MEASUREMENT AND PAYMENT

Micropiles will be measured and paid in units of each. Micropiles will be measured as the number of acceptable piles and no payment will be made for any costs associated with unacceptable micropiles. The contract unit price for 7" Dia. Micropiles will be full compensation for submittals, design, monitoring and recording, labor, tools, equipment and reinforcement complete and in place and all incidentals necessary to drill through any material and construct micropiles in accordance with this provision. The contract unit price for 7" Dia. Micropiles will be full compensation for grout up to twice the theoretical drill hole volume. Grout in excess of twice the theoretical drill hole volume will be paid as extra work in accordance with Article 104-7 of the *Standard Specifications*.

*Demonstration Micropiles* will be measured and paid in units of each. *Demonstration Micropiles* will be measured as the number of acceptable demonstration piles and no payment will be made for any costs associated with unacceptable demonstration micropiles. The contract unit price for *Demonstration Micropiles* will be full compensation for submittals, design, monitoring and recording, labor, tools, equipment and reinforcement complete and in place and all incidentals necessary to drill through any material and construct demonstration micropiles in accordance with this provision. The contract unit price for *Demonstration Micropiles* will be full compensation for grout up to twice the theoretical drill

# GT-3.10

hole volume. Grout in excess of twice the theoretical drill hole volume will be paid as extra work in accordance with Article 104-7 of the *Standard Specifications*.

*Micropile Verification Tests* and *Micropile Proof Tests* will be measured and paid in units of each, depending on the type of test. Load tests will be measured as the number of initial tests shown in the plans or required by the Engineer. No payment will be made for subsequent load tests performed on the same micropiles or replacement piles. The contract unit prices for *Micropile Verification Tests* and *Micropile Proof Tests* will be full compensation for load testing that meets Section 9.0 of this provision.

Payment will be made under foundation:

<b>Pay Item</b>	<b>Pay Unit</b>
7" Dia. Micropiles	Each
Micropile Verification Tests	Each



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Shane C. Clark  
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3/22/2018

P-5705BA/BB

## GT-4.1

Mecklenburg County

### **STANDARD SHORING:**

(SPECIAL)

#### **Description**

This provision only applies to temporary shoring that is required for the maintenance of highway traffic as identified in the Transportation Management Plan.

Standard shoring includes standard temporary shoring and standard temporary mechanically stabilized earth (MSE) walls. At the Contractor's option, use standard shoring as noted in the plans or as directed. When using standard shoring, a temporary shoring design submittal is not required. Construct standard shoring based on actual elevations and shoring dimensions in accordance with the contract and Geotechnical Standard Detail No. 1801.01 or 1801.02.

Define "standard temporary shoring" as cantilever shoring that meets the standard temporary shoring detail (Geotechnical Standard Detail No. 1801.01). Define "standard temporary wall" as a temporary MSE wall with geotextile or geogrid reinforcement that meets the standard temporary wall detail (Geotechnical Standard Detail No. 1801.02). Define "standard temporary geotextile wall" as a standard temporary wall with geotextile reinforcement and "standard temporary geogrid wall" as a standard temporary wall with geogrid reinforcement.

Provide positive protection for standard shoring at locations shown in the plans and as directed. See *Temporary Shoring* provision for positive protection types and definitions.

#### **Materials**

Refer to the *Standard Specifications*.

<b>Item</b>	<b>Section</b>
Concrete Barrier Materials	1170-2
Flowable Fill, Excavatable	1000-6
Geosynthetics	1056
Neat Cement Grout, Type 1	1003
Portland Cement Concrete, Class A	1000
Select Materials	1016
Steel Beam Guardrail Materials	862-2
Steel Sheet Piles and H-Piles	1084
Untreated Timber	1082-2
Welded Wire Reinforcement	1070-3

Provide Type 6 material certifications for shoring materials. Use Class IV select material for temporary guardrail. Use Class A concrete that meets Article 450-2 of the *Standard Specifications* or grout for drilled-in piles.

Based on actual shoring height, positive protection, groundwater elevation, slope or surcharge case and traffic impact at each standard temporary shoring location, use sheet piles with the minimum required section modulus or H-piles with the sizes shown in Geotechnical Standard Detail No. 1801.01. Use untreated timber with a thickness of at least 3" and a bending stress of at least 1,000 psi for timber lagging.

#### **(A) Shoring Backfill**

Use Class II, Type 1, Class III, Class V or Class VI select material or material that meets AASHTO M 145 for soil classification A-2-4 with a maximum PI of 6 for shoring backfill except do not use the following:

- (1) A-2-4 soil for backfill around culverts,
- (2) A-2-4 soil in the reinforced zone of standard temporary walls with a back slope and
- (3) Class VI select material in the reinforced zone of standard temporary geotextile walls.

**(B) Standard Temporary Walls**

Use welded wire reinforcement for welded wire facing, struts and wires with the dimensions and minimum wire sizes shown in Geotechnical Standard Detail No. 1801.02. Provide Type 2 geotextile for separation and retention geotextiles. Do not use more than 4 different reinforcement strengths for each standard temporary wall.

(1) Geotextile Reinforcement

Provide Type 5 geotextile for geotextile reinforcement with a mass per unit area of at least 8 oz/sy in accordance with ASTM D5261. Based on actual wall height, groundwater elevation, slope or surcharge case and shoring backfill to be used in the reinforced zone at each standard temporary geotextile wall location, provide geotextiles with ultimate tensile strengths as shown in Geotechnical Standard Detail No. 1801.02.

(2) Geogrid Reinforcement

Use geogrids with a roll width of at least 4 ft and an “approved” or “approved for provisional use” status code. The list of approved geogrids is available from: [connect.ncdot.gov/resources/Materials/Pages/SoilsLaboratory.aspx](http://connect.ncdot.gov/resources/Materials/Pages/SoilsLaboratory.aspx)

Based on actual wall height, groundwater elevation, slope or surcharge case and shoring backfill to be used in the reinforced zone at each standard temporary geogrid wall location, provide geogrids for geogrid reinforcement with short-term design strengths as shown in Geotechnical Standard Detail No. 1801.02. Geogrids are typically approved for ultimate tensile strengths in the machine direction (MD) and cross-machine direction (CD) or short-term design strengths for a 3-year design life in the MD based on material type. Define material type from the website above for shoring backfill as follows:

Material Type	Shoring Backfill
Borrow	A-2-4 Soil
Fine Aggregate	Class II, Type 1 or Class III Select Material
Coarse Aggregate	Class V or VI Select Material

If the website does not list a short-term design strength for an approved geogrid, use a short-term design strength equal to the ultimate tensile strength divided by 3.5 for the geogrid reinforcement.

### **Preconstruction Requirements**

#### **(A) Concrete Barrier**

Define “clear distance” behind concrete barrier as the horizontal distance between the barrier and edge of pavement. The minimum required clear distance for concrete barrier is shown in the plans. At the Contractor’s option or if the minimum required clear distance is not available, set concrete barrier next to and up against traffic side of standard shoring except for barrier above standard temporary walls. Concrete barrier with the minimum required clear distance is required above standard temporary walls.

#### **(B) Temporary Guardrail**

Define “clear distance” behind temporary guardrail as the horizontal distance between guardrail posts and standard shoring. At the Contractor’s option or if clear distance for standard temporary shoring is less than 4 ft, attach guardrail to traffic side of shoring as shown in the plans. Place ABC in clear distance and around guardrail posts instead of pavement. Do not use temporary guardrail above standard temporary walls.

#### **(C) Standard Shoring Selection Forms**

Before beginning standard shoring construction, survey existing ground elevations in the vicinity of standard shoring locations to determine actual shoring or wall heights (H). Submit a standard shoring selection form for each location at least 7 days before starting standard shoring construction. Standard shoring selection forms are available from: [connect.ncdot.gov/resources/Geological/Pages/Geotech\\_Forms\\_Details.aspx](http://connect.ncdot.gov/resources/Geological/Pages/Geotech_Forms_Details.aspx)

#### **(D) Preconstruction Meeting**

The Engineer may require a shoring preconstruction meeting to discuss the construction and inspection of the standard shoring. If required, schedule this meeting after all standard shoring selection forms have been submitted. The Resident, District or Bridge Maintenance Engineer, Bridge or Roadway Construction Engineer, Geotechnical Operations Engineer, Contractor and Shoring Contractor Superintendent will attend this preconstruction meeting.

### **Construction Methods**

Construct standard shoring in accordance with the *Temporary Shoring* provision.

#### **(A) Standard Temporary Shoring Installation**

Based on actual shoring height, positive protection, groundwater elevation, slope or surcharge case and traffic impact at each standard temporary shoring location, install piles with the minimum required embedment and extension for each shoring section in accordance with Geotechnical Standard Detail No. 1801.01. For concrete barrier above and next to standard temporary shoring and temporary guardrail above and attached to standard temporary shoring, use “surcharge case with traffic impact” in accordance with Geotechnical Standard Detail No. 1801.01. Otherwise, use “slope or surcharge case with no traffic impact” in accordance with Geotechnical Standard Detail No. 1801.01. If refusal is reached before driven piles attain the minimum required embedment, use drilled-in H-

piles with timber lagging for standard temporary shoring.

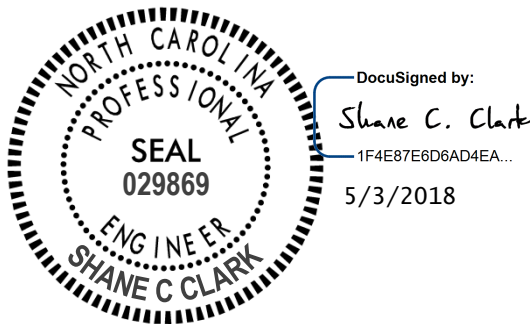
**(B) Standard Temporary Walls Installation**

Based on actual wall height, groundwater elevation, slope or surcharge case, geotextile or geogrid reinforcement and shoring backfill in the reinforced zone at each standard temporary wall location, construct walls with the minimum required reinforcement length and number of reinforcement layers for each wall section in accordance with Geotechnical Standard Detail No. 1801.02. For standard temporary walls with pile foundations in the reinforced zone, drive piles through reinforcement after constructing temporary walls.

For standard temporary walls with interior angles less than 90°, wrap geosynthetics at acute corners as directed by the Engineer. Place geosynthetics as shown in Geotechnical Standard Detail No. 1801.02. Place separation geotextiles between shoring backfill and backfill, natural ground or culverts along the sides of the reinforced zone perpendicular to the wall face. For Class V or VI select material in the reinforced zone, place separation geotextiles between shoring backfill and backfill or natural ground on top of and at the back of the reinforced zone.

**Measurement and Payment**

Standard shoring will be measured and paid in accordance with the *Temporary Shoring* provision.





**PROJECT SPECIAL PROVISIONS  
GEOENVIRONMENTAL**

**CONTAMINATED SOIL AND WATER (4/9/2018)**

The Contractor's attention is directed to the fact that ash, cinders, and soil and groundwater contaminated with petroleum hydrocarbon and chlorinated solvent compounds are known to exist within the project area. Information relating to these contaminated areas, sample locations, and investigation reports will be available at the following web address by navigating to the correct letting year and month then selecting, "Plans and Proposals", "Mecklenburg P-5705BA/BB", "GeoEnv Postings":

<http://dotw-xfer01.dot.state.nc.us/dsplan/>

Petroleum contaminated soil, ash, cinders, and non-hazardous contaminated groundwater may be encountered during any earthwork activities on the project.

**SOIL**

The Contractor shall only excavate those soils that the Engineer designates necessary to complete a particular task. All excavated wet soil and rock shall to be considered contaminated and properly disposed. For soil encountered during other excavations and grading that do not extend into groundwater, the Engineer shall determine if soil is contaminated based on petroleum odors and unusual soil staining or visual indication of ash or cinders. Contaminated soil that is not required to be excavated is to remain in place and undisturbed. Undisturbed soil shall remain in place, whether contaminated or not. The Contractor shall properly dispose of excavated wet soil and any other contaminated soil or ash or cinders excavated from the project at a facility licensed to accept the material.

In the event that the Contractor chooses to stockpile the soil temporarily, soil stockpiles shall be created within the property boundaries of the source material and in accordance with Diagram for Temporary Containment and Treatment of Petroleum-Contaminated Soil per GUIDELINES FOR EX SITU PETROLEUM CONTAMINATED SOIL REMEDIATION UST Section North Carolina Department of Environment and Natural Resources Division of Waste Management. If the volume of contaminated material exceeds available space on site, the Contractor shall obtain a permit from the NCDEQ UST Section's Regional Office for off-site temporary storage. The excavation and stockpiling of contaminated soil will be incidental to the project.

**WATER**

Groundwater in the project vicinity is documented to be contaminated according to the Groundwater Assessment Report dated December 4, 2017. The contractor shall containerize any fluid generated by groundwater dewatering and/or liquefaction of slurry in vessels provided by the Department. The Department will be responsible for the sampling and disposal of the water. Containerizing fluid will be incidental to the project.

The quantity of contaminated soil disposed shall be the actual number of tons of material, which has been acceptably excavated, tested, transported, and weighed with certified scales and shown on a waste disposal manifest. The quantity of contaminated soil shall be paid for at the contract unit price per ton for "Hauling and Disposal of Contaminated Soil".

**Pay Item**  
Hauling and Disposal of Contaminated Soil

**Pay Unit**  
Tons

DocuSigned by:  
*Cyrus Parker*  
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4/9/2018



PROJECT SPECIAL PROVISIONS  
Utility Construction



License No. C-2639  
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(Seal)

DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

**Revise the 2018 Standard Specifications as follows:**

**Page 15-1, Sub-article 1500-2 Cooperation with the Utility Owner, paragraph 2:**  
add the following sentences:

The utility owner is Charlotte Water (CLTWater). The contact person for CLTWater is Bill Deal, PE; and he can be reached by phone at (980) 722-0786 or by email at wdeal@ci.charlotte.nc.us. The contractor is required to contact Bill Deal at least two (2) weeks prior to the commencement of any water and/or sewer construction.

Prior to water and/or sewer construction, the contractor must submit to Bill Deal, PE of CLTWater, the proposed utility material submittals and shop drawings, as applicable for CLTWater review and obtain CLTWater approval of utility material submittals and shop drawings. At the engineer's discretion, submittals and communication will be sent to Bill Deal through, and/or copy to the engineer.

The contractor shall keep CLTWater's appointed representative informed of the work progress and provide opportunity for inspection of construction and testing.

The contractor shall maintain water and sewer service to existing customers during construction, minimize the duration of any service disruption, and notify the CLTWater representative at least 48 hours in advance of any scheduled service disruption.

The contractor shall maintain access to the pedestrian trail between the Panther's stadium and practice field during construction, minimize the duration of any closures, and notify Tom

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**UC-2**

County: Mecklenburg

Vaughan of the Panthers at Tom.Vaughan@Panthers.NFL.com least 2 weeks prior to any sewer work in this area.

All work associated with the 24-inch sanitary sewer relocation is subject to additional work plan and limitations of work requirements as stipulated in the *Bank of America Stadium Requirements* special provision.

The contractor shall have on site the necessary primary and backup pumps to adequately handle any and all flow from the existing 18-inch sewer. Pumps must be on site for the entire duration of construction of the proposed bridges and structures in the P&N area of the project. Bypass pumping systems, including schedule, equipment and redundancies or backup plan, shall be submitted to the engineer and CLTWater for approval.

The contractor shall use viton gaskets or approved equal on all water and sewer pipe connections.

Provide materials for the proposed water and sewer utilities construction meeting the applicable requirements (i.e. material specifications, standard details, testing, policies, etc.) of CLTWater's standard specifications and applicable current CLTWater standard details as of Date of Advertisement. CLTWater's specifications and details can be obtained from CLTWater at <http://charlottenc.gov/Water/Pages/DesignManual.aspx>.

Measurement and payment for work will be in accordance with the *NCDOT Standard Specifications for Roads and Structures*, January 2018.

### **CURED-IN-PLACE PIPE (CIPP)**

#### **General:**

*Cured-In-Place Pipe* shall be installed in accordance with the applicable utility provisions herein, as shown on the utility plans, and/or as directed by the Engineer.

The Contractor shall reconstruct sanitary sewer by the installation of a resin impregnated flexible tube inverted into the existing sewer line and cured in place. The installation shall be to the size, length, and elevations shown on the plans or as directed by the engineer.

This specification references ASTM F1216 (Rehabilitation of pipelines by the inversion and curing of a resin-impregnated tube), and ASTM D790 (Test methods for flexural properties of unreinforced plastics) which are made a part hereof by such reference and shall be the latest edition and revision thereof. In case of conflicting requirements between this specification and these referenced documents, this specification will govern.

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**UC-3**

County: Mecklenburg

Pipe shall be fiber felt impregnated with thermosetting unsaturated polyester resin and catalyst system capable of obtaining, upon curing a minimum flexural stress of 4,500 psi and a minimum flexural modulus of elasticity of 250,000 psi, tested in accordance with ASTM D-790. Pipe shall have an impermeable plastic membrane to provide containment of the uncured resin. The Contractor shall provide certification from the resin pipe manufacturer that a sample of installed liner will meet the specified ASTM requirements.

Cured resin pipe shall be chemically resistant to internal exposure to domestic sewage.

The Contractor shall determine the actual length and internal circumference of sewers to be reconstructed from the plans and from actual field inspection to effectively span the distance from manhole to manhole for the extent of the project. Sections of sewer that are to be reconstructed are noted on the plans.

The resin pipe shall be fabricated to the thickness as recommended by resin pipe manufacturer subject to the Engineer approval. When installed the resin pipe shall conform to the internal circumference of the existing sewer line. Allowance shall be made for circumferential stretching during installation. A certified copy of the manufacturer's required thickness design criteria shall be submitted to the Engineer for approval.

The Contractor shall be responsible for cleaning of the sewer line to be reconstructed prior to the start of installation. Pipe shall be cleaned utilizing high pressure jet cleaning or as direct by the Engineer.

Cleaning shall be performed in such a manner as to not damage the existing sewer line. The Contractor shall be responsible for damage resulting from cleaning activities. Cleaning shall include the removal of any debris, roots and other items that would interfere with the installation of the resin pipe. The Contractor shall restore the inside diameter to 95% of the original diameter.

The Contractor shall videotape the interior of the existing sewer line at the completion of cleaning. Two copies of this tapping and inspection log shall be delivered to the Engineer. The Contractor shall carefully inspect the interior to determine conditions that may prevent proper installation of the resin pipe. Locations of service connections shall be noted at the time of inspection.

The Owner shall provide a dump site for all debris removed from the sewers during the cleaning operation. Unless stated otherwise, it is assumed this site will be at or near the sewage treatment facility to which the debris would have arrived in absence of the cleaning operation. Any

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**UC-4**

County: Mecklenburg

hazardous waste material encountered during this project will be disposed of in accordance with all local and state requirements.

The Contractor shall provide Charlotte Water access to inspect materials and impregnation procedure.

Care shall be taken to transport materials to the site, free of material defects. Any resin pipe with material defects will not be accepted, and will be the responsibility of the Contractor to replace.

The inversion standpipe shall be inserted through the manholes shown on the plans. All temporary scaffolding and supports shall be the responsibility of the Contractor. The uncured resin impregnated pipe shall be inserted through the standpipe and attached, and inverted into the existing sewer line utilizing a hydrostatic head sufficient to fully extend it through to the next manhole. The tube shall be installed tightly against the interior wall of the pipe to produce dimples at service connections and to produce flares at manholes. The Contractor as necessary shall use lubrication.

The Contractor, when required, shall provide for the flow of sewage around the section or sections of pipe designated for repair. The bypass shall be made by plugging the line at an existing upstream manhole and pumping the flow into a downstream manhole or adjacent system. The pump and bypass lines shall be of adequate capacity and size to handle the flow. The Owner may require a detail of the bypass plan to be submitted. The approval of the bypassing system in advance by the Engineer shall in no way relieve the Contractor of responsibility to prevent dumping of raw sewage on private property, city streets, or in storm drainage systems.

After inversion is completed the Contractor shall supply suitable heat source and water recirculation equipment. The equipment shall be capable of delivering hot water throughout the section by means of pre-strung hose to uniformly raise the water temperature above the temperature required to effect a cure of the resin. This temperature shall be determined as recommended by the resin manufacturer.

The heat source shall be fitted with suitable monitors to gauge the temperature of the incoming and outgoing water supply. Another such gauge shall be placed between the resin pipe and the pipe invert at the remote manhole to determine the temperature during curing. Care shall be taken during the curing process so as not to overstress the felt fiber.

The cure period shall be of a duration recommended by the resin manufacturer as modified for the resin, cure in place pipe process. The recirculation of the water and cycling of the heat exchanger shall be continuous in order to maintain the required temperature throughout the duration of the curing period.

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The Contractor shall cool the hardened resin pipe to a temperature below 100 degree F before relieving the static head in the inversion standpipe. Cool-down may be accomplished by the introduction of cool water into the inversion standpipe to replace water being drained from a small hole made in the downstream end. Care shall be taken in the release of the static head so that a vacuum will not be developed that could damage the resin pipe.

The finished resin pipe shall be continuous over the entire length of each inversion run and shall be free from visual defects such as foreign inclusions, dry spots, pinholes and delamination. Visual inspection of the resin pipe shall be in accordance with ASTM F1743, Section 8.6. During the duration of the project any defects found which will affect the integrity or strength of the resin pipe shall be repaired at the Contractor's expense, in a manner mutually agreed upon by the Owner, Contractor, and manufacturer.

If installation of the resin pipe fails to make a tight seal at the manhole, the Contractor shall apply a resin mixture compatible with the resin pipe to provide a water tight seal.

Following curing of the resin pipe, the Contractor shall re-establish existing services connections as identified during pre-taping and as directed by the Engineer. Services shall be re-established from interior of the pipeline by means of a television camera and cutting device. Open excavations shall not be used unless approved by the engineer.

The Contractor shall provide the equipment necessary to test the sewer lines for infiltration or exfiltration. The leakage test for the cured in place sewer line shall meet the requirements for testing new sewer lines as previously stated in the beginning of these specifications.

The Contractor shall provide Charlotte Water with a videotape of the finished and accepted cured-in-place pipe.

**Measurement and Payment:**

The quantity of *Cured-In-Place Pipe*, installed in accordance with plans and provisions herein and accepted, will be measured and paid for at the contract unit price per linear foot for 8" *Cured-In-Place-Pipe*". Such prices and payment will be full compensation for testing, furnishing all labor, equipment, materials, and incidentals necessary to complete the work as required.

**Pay Item**  
8" Cured-In-Place Pipe

**Pay Unit**  
LF

**END OF SECTION**

PROJECT SPECIAL PROVISIONS

## Utilities by Others

**General:**

The following utility companies have facilities that will be in conflict with the construction of this project:

- A) Power – Duke Energy
- B) Phone – Verizon
- C) Phone – CenturyLink
- D) Phone – AT&T
- E) Phone – Zayo
- F) CATV – Spectrum

The conflicting facilities of these concerns will be adjusted prior to the date of availability, unless otherwise noted and are therefore listed in these special provisions for the benefit of the Contractor. All utility work listed herein will be done by the utility owners. All utilities are shown on the plans from the best available information.

The City of Charlotte is overseeing the utility coordination and utility authorization. The City contact is:

Kisha Generette  
 Utility Coordinator  
 (704) 572-7780  
[kgenerette@ci.charlotte.nc.us](mailto:kgenerette@ci.charlotte.nc.us)

The Contractor's attention is directed to Article 105-8 of the 2018 Standard Specifications.

**Utilities Requiring Adjustment:**

Utility relocations are shown on the Utilities by Others Plans.

- A) Duke Energy  
 Jim Anderson  
 (704) 395-4446  
[jim.anderson2@duke-energy.com](mailto:jim.anderson2@duke-energy.com)



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## UbO-2

County: Mecklenburg

### PROJECT SPECIAL PROVISIONS

#### Utilities by Others

B) Verizon

Eric Crane

(919) 326-5604

[eric.crane@verizon.com](mailto:eric.crane@verizon.com)

C) CenturyLink

Richard Browning

(336) 268-8942

[dennis.browning@centurylink.com](mailto:dennis.browning@centurylink.com)

1. CenturyLink cable will be relocated by September 1, 2018.

D) AT&T

Roger Ramsey

(704) 424-1443

[rr2136@att.com](mailto:rr2136@att.com)

DI) Spectrum

Greg Brown

(980) 722-7631

[Gregg.brown@twcable.com](mailto:Gregg.brown@twcable.com)

1. Spectrum will have completed their relocation by September 1, 2018

**Project Special Provisions**  
**Erosion Control**

**STABILIZATION REQUIREMENTS:**

(3-11-2016)

Stabilization for this project shall comply with the time frame guidelines as specified by the NCG-010000 general construction permit effective August 1, 2016 issued by the North Carolina Department of Environmental Quality Division of Water Resources. Temporary or permanent ground cover stabilization shall occur within 7 calendar days from the last land-disturbing activity, with the following exceptions in which temporary or permanent ground cover shall be provided in 14 calendar days from the last land-disturbing activity:

- Slopes between 2:1 and 3:1, with a slope length of 10 ft. or less
- Slopes 3:1 or flatter, with a slope of length of 50 ft. or less
- Slopes 4:1 or flatter

The stabilization timeframe for High Quality Water (HQW) Zones shall be 7 calendar days with no exceptions for slope grades or lengths. High Quality Water Zones (HQW) Zones are defined by North Carolina Administrative Code 15A NCAC 04A.0105 (25). Temporary and permanent ground cover stabilization shall be achieved in accordance with the provisions in this contract and as directed.

**SEEDING AND MULCHING:**

**(West)**

The kinds of seed and fertilizer, and the rates of application of seed, fertilizer, and limestone, shall be as stated below. During periods of overlapping dates, the kind of seed to be used shall be determined. All rates are in pounds per acre.

**Shoulder and Median Areas**

**August 1 - June 1**

20#	Kentucky Bluegrass
75#	Hard Fescue
25#	Rye Grain
500#	Fertilizer
4000#	Limestone

**May 1 - September 1**

20#	Kentucky Bluegrass
75#	Hard Fescue
10#	German or Browntop Millet
500#	Fertilizer
4000#	Limestone

**Areas Beyond the Mowing Pattern, Waste and Borrow Areas:**

**August 1 - June 1**

100#	Tall Fescue
15#	Kentucky Bluegrass
30#	Hard Fescue
25#	Rye Grain
500#	Fertilizer
4000#	Limestone

**May 1 - September 1**

100#	Tall Fescue
15#	Kentucky Bluegrass
30#	Hard Fescue
10#	German or Browntop Millet
500#	Fertilizer
4000#	Limestone

## Approved Tall Fescue Cultivars

06 Dust	Escalade	Justice	Serengeti
2 <sup>nd</sup> Millennium	Essential	Kalahari	Shelby
3 <sup>rd</sup> Millennium	Evergreen 2	Kitty Hawk 2000	Sheridan
Apache III	Falcon IV	Legitimate	Signia
Avenger	Falcon NG	Lexington	Silver Hawk
Barlexas	Falcon V	LSD	Sliverstar
Barlexas II	Faith	Magellan	Shenandoah Elite
Bar Fa	Fat Cat	Matador	Sidewinder
Barrera	Festnova	Millennium SRP	Skyline
Barrington	Fidelity	Monet	Solara
Barrobusto	Finelawn Elite	Mustang 4	Southern Choice II
Barvado	Finelawn Xpress	Ninja 2	Speedway
Biltmore	Finesse II	Ol' Glory	Spyder LS
Bingo	Firebird	Olympic Gold	Sunset Gold
Bizem	Firecracker LS	Padre	Taccoa
Blackwatch	Firenza	Patagonia	Tanzania
Blade Runner II	Five Point	Pedigree	Trio
Bonsai	Focus	Picasso	Tahoe II
Braveheart	Forte	Piedmont	Talladega
Bravo	Garrison	Plantation	Tarheel
Bullseye	Gazelle II	Proseeds 5301	Terrano
Cannavaro	Gold Medallion	Prospect	Titan Ltd
Catalyst	Grande 3	Pure Gold	Titanium LS
Cayenne	Greenbrooks	Quest	Tracer
Cessane Rz	Greenkeeper	Raptor II	Traverse SRP
Chipper	Gremlin	Rebel Exeda	Tulsa Time
Cochise IV	Greystone	Rebel Sentry	Turbo
Constitution	Guardian 21	Rebel IV	Turbo RZ
Corgi	Guardian 41	Regiment II	Tuxedo RZ
Corona	Hemi	Regenerate	Ultimate
Coyote	Honky Tonk	Rendition	Venture
Darlington	Hot Rod	Rhambler 2 SRP	Umbrella
Davinci	Hunter	Rembrandt	Van Gogh
Desire	Inferno	Reunion	Watchdog
Dominion	Innovator	Riverside	Wolfpack II
Dynamic	Integrity	RNP	Xtremegreen
Dynasty	Jaguar 3	Rocket	
Endeavor	Jamboree	Scorpion	

## Approved Kentucky Bluegrass Cultivars:

4-Season	Blue Velvet	Gladstone	Quantum Leap
Alexa II	Blueberry	Granite	Rambo
America	Boomerang	Hampton	Rhapsody
Apollo	Brilliant	Harmonie	Rhythm
Arcadia	Cabernet	Impact	Rita
Aries	Champagne	Jefferson	Royce
Armada	Champlain	Juliet	Rubicon
Arrow	Chicago II	Jump Start	Rugby II
Arrowhead	Corsair	Keeneland	Shiraz
Aura	Courtyard	Langara	Showcase
Avid	Delight	Liberator	Skye
Award	Diva	Madison	Solar Eclipse
Awesome	Dynamo	Mercury	Sonoma
Bandera	Eagleton	Midnight	Sorbonne
Barduke	Emblem	Midnight II	Starburst
Barnique	Empire	Moon Shadow	Sudden Impact
Baroness	Envicta	Moonlight SLT	Total Eclipse
Barrister	Everest	Mystere	Touche
Barvette HGT	Everglade	Nu Destiny	Tsunami
Bedazzled	Excursion	NuChicago	Unique
Belissimo	Freedom II	NuGlade	Valor
Bewitched	Freedom III	Odyssey	Voyager II
Beyond	Front Page	Perfection	Washington
Blacksburg II	Futurity	Pinot	Zinfandel
Blackstone	Gaelic	Princeton 105	
Blue Note	Ginney II	Prosperity	

## Approved Hard Fescue Cultivars:

Aurora II	Eureka II	Oxford	Scaldis II
Aurora Gold	Firefly	Reliant II	Spartan II
Berkshire	Granite	Reliant IV	Stonehenge
Bighorn GT	Heron	Rescue 911	
Chariot	Nordic	Rhino	

On cut and fill slopes 2:1 or steeper add 20# Sericea Lespedeza January 1 - December 31.

Fertilizer shall be 10-20-20 analysis. A different analysis of fertilizer may be used provided the 1-2-2 ratio is maintained and the rate of application adjusted to provide the same amount of plant food as a 10-20-20 analysis and as directed.

**Native Grass Seeding And Mulching**

**(West)**

Native Grass Seeding and Mulching shall be performed on the disturbed areas of wetlands and riparian areas, and adjacent to Stream Relocation and/or trout stream construction within a 50 foot zone on both sides of the stream or depression, measured from top of stream bank or center of depression. The stream bank of the stream relocation shall be seeded by a method that does not alter the typical cross section of the stream bank. Native Grass Seeding and Mulching shall also be performed in the permanent soil reinforcement mat section of preformed scour holes, and in other areas as directed.

The kinds of seed and fertilizer, and the rates of application of seed, fertilizer, and limestone, shall be as stated below. During periods of overlapping dates, the kind of seed to be used shall be determined. All rates are in pounds per acre.

**August 1 - June 1**

- 18# Creeping Red Fescue
- 8# Big Bluestem
- 6# Indiangrass
- 4# Switchgrass
- 35# Rye Grain
- 500# Fertilizer
- 4000# Limestone

**May 1 – September 1**

- 18# Creeping Red Fescue
- 8# Big Bluestem
- 6# Indiangrass
- 4# Switchgrass
- 25# German or Browntop Millet
- 500# Fertilizer
- 4000# Limestone

Approved Creeping Red Fescue Cultivars:

- Aberdeen
- Boreal
- Epic
- Cindy Lou

Fertilizer shall be 10-20-20 analysis. A different analysis of fertilizer may be used provided the 1-2-2 ratio is maintained and the rate of application adjusted to provide the same amount of plant food as a 10-20-20 analysis and as directed.

Native Grass Seeding and Mulching shall be performed in accordance with Section 1660 of the *Standard Specifications* and vegetative cover sufficient to restrain erosion shall be installed immediately following grade establishment.

**Measurement and Payment**

Native Grass *Seeding and Mulching* will be measured and paid for in accordance with Article 1660-8 of the *Standard Specifications*.

**TEMPORARY SEEDING:**

Fertilizer shall be the same analysis as specified for *Seeding and Mulching* and applied at the rate of 400 pounds and seeded at the rate of 50 pounds per acre. German Millet, or Browntop Millet shall be used in summer months and rye grain during the remainder of the year. The Engineer will determine the exact dates for using each kind of seed.

**FERTILIZER TOPDRESSING:**

Fertilizer used for topdressing shall be 16-8-8 grade and shall be applied at the rate of 500 pounds per acre. A different analysis of fertilizer may be used provided the 2-1-1 ratio is maintained and the rate of application adjusted to provide the same amount of plant food as 16-8-8 analysis and as directed.

**SUPPLEMENTAL SEEDING:**

The kinds of seed and proportions shall be the same as specified for *Seeding and Mulching*, and the rate of application may vary from 25# to 75# per acre. The actual rate per acre will be determined prior to the time of topdressing and the Contractor will be notified in writing of the rate per acre, total quantity needed, and areas on which to apply the supplemental seed. Minimum tillage equipment, consisting of a sod seeder shall be used for incorporating seed into the soil as to prevent disturbance of existing vegetation. A clodbuster (ball and chain) may be used where degree of slope prevents the use of a sod seeder.

**MOWING:**

The minimum mowing height on this project shall be six inches.

**LAWN TYPE APPEARANCE:**

All areas adjacent to lawns must be hand finished as directed to give a lawn type appearance. Remove all trash, debris, and stones  $\frac{3}{4}$ " and larger in diameter or other obstructions that could interfere with providing a smooth lawn type appearance. These areas shall be reseeded to match their original vegetative conditions, unless directed otherwise by the Field Operations Engineer.

**RESPONSE FOR EROSION CONTROL:****Description**

Furnish the labor, materials, tools and equipment necessary to move personnel, equipment, and supplies to the project necessary for the pursuit of any or all of the following work as shown herein, by an approved subcontractor.

<b>Section</b>	<b>Erosion Control Item</b>	<b>Unit</b>
1605	Temporary Silt Fence	LF
1606	Special Sediment Control Fence	LF/TON
1615	Temporary Mulching	ACR
1620	Seed - Temporary Seeding	LB
1620	Fertilizer - Temporary Seeding	TN

1631	Matting for Erosion Control	SY
SP	Coir Fiber Mat	SY
1640	Coir Fiber Baffles	LF
SP	Permanent Soil Reinforcement Mat	SY
1660	Seeding and Mulching	ACR
1661	Seed - Repair Seeding	LB
1661	Fertilizer - Repair Seeding	TON
1662	Seed - Supplemental Seeding	LB
1665	Fertilizer Topdressing	TON
SP	Safety/Highly Visible Fencing	LF
SP	Response for Erosion Control	EA

**Construction Methods**

Provide an approved subcontractor who performs an erosion control action as described in the NPDES Inspection Form SPPP30. Each erosion control action may include one or more of the above work items.

**Measurement and Payment**

*Response for Erosion Control* will be measured and paid for by counting the actual number of times the subcontractor moves onto the project, including borrow and waste sites, and satisfactorily completes an erosion control action described in Form 1675. The provisions of Article 104-5 of the *Standard Specifications* will not apply to this item of work.

Payment will be made under:

<b>Pay Item</b>	<b>Pay Unit</b>
Response for Erosion Control	Each

**MINIMIZE REMOVAL OF VEGETATION:**

The Contractor shall minimize removal of vegetation within project limits to the maximum extent practicable. Vegetation along stream banks and adjacent to other jurisdictional resources outside the construction limits shall only be removed upon approval of Engineer. No additional payment will be made for this minimization work.

**STOCKPILE AREAS:**

The Contractor shall install and maintain erosion control devices sufficient to contain sediment around any erodible material stockpile areas as directed.

**ACCESS AND HAUL ROADS:**

At the end of each working day, the Contractor shall install or re-establish temporary diversions or earth berms across access/haul roads to direct runoff into sediment devices. Silt fence sections that are temporarily removed shall be reinstalled across access/haul roads at the end of each working day.

**WASTE AND BORROW SOURCES:**

Payment for temporary erosion control measures, except those made necessary by the Contractor's own negligence or for his own convenience, will be paid for at the appropriate contract unit price for the devices or measures utilized in borrow sources and waste areas.

No additional payment will be made for erosion control devices or permanent seeding and mulching in any commercial borrow or waste pit. All erosion and sediment control practices that may be required on a commercial borrow or waste site will be done at the Contractor's expense.

All offsite Staging Areas, Borrow and Waste sites shall be in accordance with "Borrow and Waste Site Reclamation Procedures for Contracted Projects" located at:

[http://www.ncdot.gov/doh/operations/dp\\_chief\\_eng/roadside/fieldops/downloads/Files/ContractedReclamationProcedures.pdf](http://www.ncdot.gov/doh/operations/dp_chief_eng/roadside/fieldops/downloads/Files/ContractedReclamationProcedures.pdf)

All forms and documents referenced in the "Borrow and Waste Site Reclamation Procedures for Contracted Projects" shall be included with the reclamation plans for offsite staging areas, and borrow and waste sites.

**SAFETY FENCE AND JURISDICTIONAL FLAGGING:****Description**

*Safety Fence* shall consist of furnishing materials, installing and maintaining polyethylene or polypropylene fence along the outside riparian buffer, wetland, or water boundary, or other boundaries located within the construction corridor to mark the areas that have been approved to infringe within the buffer, wetland, endangered vegetation, culturally sensitive areas or water. The fence shall be installed prior to any land disturbing activities.

Interior boundaries for jurisdictional areas noted above shall be delineated by stakes and highly visible flagging.



Jurisdictional boundaries at staging areas, waste sites, or borrow pits, whether considered outside or interior boundaries shall be delineated by stakes and highly visible flagging.

**Materials**

## (A) Safety Fencing

Polyethylene or polypropylene fence shall be a highly visible preconstructed safety fence approved by the Engineer. The fence material shall have an ultraviolet coating.

Either wood posts or steel posts may be used. Wood posts shall be hardwood with a wedge or pencil tip at one end, and shall be at least 5 ft. in length with a minimum nominal 2" x 2" cross section. Steel posts shall be at least 5 ft. in length, and have a minimum weight of 0.85 lb/ft of length.

## (B) Boundary Flagging

Wooden stakes shall be 4 feet in length with a minimum nominal 3/4" x 1-3/4" cross section. The flagging shall be at least 1" in width. The flagging material shall be vinyl and shall be orange in color and highly visible.

**Construction Methods**

No additional clearing and grubbing is anticipated for the installation of this fence. The fence shall be erected to conform to the general contour of the ground.

## (A) Safety Fencing

Posts shall be set at a maximum spacing of 10 ft., maintained in a vertical position and hand set or set with a post driver. Posts shall be installed a minimum of 2 ft. into the ground. If hand set, all backfill material shall be thoroughly tamped. Wood posts may be sharpened to a dull point if power driven. Posts damaged by power driving shall be removed and replaced prior to final acceptance. The tops of all wood posts shall be cut at a 30-degree angle. The wood posts may, at the option of the Contractor, be cut at this angle either before or after the posts are erected.

The fence geotextile shall be attached to the wood posts with one 2" galvanized wire staple across each cable or to the steel posts with wire or other acceptable means.

Place construction stakes to establish the location of the safety fence in accordance with Article 105-9 or Article 801-1 of the *Standard Specifications*. No direct pay will be made for the staking of the safety fence. All stakeouts for safety fence shall be considered incidental to the work being paid for as "Construction Surveying", except that where there is no pay item for construction surveying, all safety fence stakeout will be performed by state forces.

The Contractor shall be required to maintain the safety fence in a satisfactory condition for the duration of the project as determined by the Engineer.

## (B) Boundary Flagging

Boundary flagging delineation of interior boundaries shall consist of wooden stakes on 25 feet maximum intervals with highly visible orange flagging attached. Stakes shall be installed a minimum of 6" into the ground. Interior boundaries may be staked on a tangent that runs parallel to buffer but must not encroach on the buffer at any location. Interior boundaries of hand clearing shall be identified with a different colored flagging to distinguish it from mechanized clearing.

Boundary flagging delineation of interior boundaries will be placed in accordance with Article 105-9 or Article 801-1 of the *Standard Specifications*. No direct pay will be made for delineation of the interior boundaries. This delineation will be considered incidental to the work being paid for as *Construction Surveying*, except that where there is no pay item or construction surveying the cost of boundary flagging delineation shall be included in the unit prices bid for the various items in the contract. Installation for delineation of all jurisdictional boundaries at staging areas, waste sites, or borrow pits shall consist of wooden stakes on 25 feet maximum intervals with highly visible orange flagging attached. Stakes shall be installed a minimum of 6" into the ground. Additional flagging may be placed on overhanging vegetation to enhance visibility but does not substitute for installation of stakes.

Installation of boundary flagging for delineation of all jurisdictional boundaries at staging areas, waste sites, or borrow pits shall be performed in accordance with Subarticle 230-4(B)(5) or Subarticle 802-2(F) of the *Standard Specifications*. No direct pay will be made for this delineation, as the cost of same shall be included in the unit prices bid for the various items in the contract.

The Contractor shall be required to maintain alternative stakes and highly visible flagging in a satisfactory condition for the duration of the project as determined by the Engineer.

**Measurement and Payment**

*Safety Fence* will be measured and paid as the actual number of linear feet of polyethylene or polypropylene fence installed in place and accepted. Such payment will be full compensation including but not limited to furnishing and installing fence geotextile with necessary posts and post bracing, staples, tie wires, tools, equipment and incidentals necessary to complete this work.

Payment will be made under:

<b>Pay Item</b>	<b>Pay Unit</b>
Safety Fence	Linear Foot

**COIR FIBER WATTLES WITH POLYACRYLAMIDE (PAM):****Description**

Coir Fiber Wattles are tubular products consisting of coir fibers (coconut fibers) encased in coir fiber netting. Coir Fiber Wattles are used on slopes or channels to intercept runoff and act as a velocity break. Coir Fiber Wattles are to be placed at locations shown on the plans or as directed.

Installation shall follow the detail provided in the plans and as directed. Work includes furnishing materials, installation of coir fiber wattles, matting installation, PAM application, and removing wattles.

### **Materials**

Coir Fiber Wattle shall meet the following specifications:

100% Coir (Coconut) Fibers	
Minimum Diameter	12 in.
Minimum Density	3.5 lb/ft <sup>3</sup> +/- 10%
Net Material	Coir Fiber
Net Openings	2 in. x 2 in.
Net Strength	90 lbs.
Minimum Weight	2.6 lbs./ft. +/- 10%

Anchors: Stakes shall be used as anchors.

#### Wooden Stakes:

Provide hardwood stakes a minimum of 2-ft. long with a 2 in. x 2 in. nominal square cross section. One end of the stake must be sharpened or beveled to facilitate driving down into the underlying soil.

Matting shall meet the requirements of Article 1060-8 of the *Standard Specifications*, or shall meet specifications provided elsewhere in this contract.

Provide staples made of 0.125" diameter new steel wire formed into a *u* shape not less than 12" in length with a throat of 1" in width.

Polyacrylamide (PAM) shall be applied in powder form and shall be anionic or neutrally charged. Soil samples shall be obtained in areas where the wattles will be placed, and from offsite material used to construct the roadway, and analyzed for the appropriate PAM flocculant to be utilized with each wattle. The PAM product used shall be listed on the North Carolina Department of Environmental Quality Division of Water Resources web site as an approved PAM product for use in North Carolina.

### **Construction Methods**

Coir Fiber Wattles shall be secured to the soil by wire staples approximately every 1 linear foot and at the end of each section of wattle. A minimum of 4 stakes shall be installed on the downstream side of the wattle with a maximum spacing of 2 linear feet along the wattle, and according to the detail. Install a minimum of 2 stakes on the upstream side of the wattle according to the detail provided in the plans. Stakes shall be driven into the ground a minimum of 10 in. with no more than 2 in. projecting from the top of the wattle. Drive stakes at an angle according to the detail provided in the plans.

Only install coir fiber wattle(s) to a height in ditch so flow will not wash around wattle and scour ditch slopes and according to the detail provided in the plans and as directed. Overlap adjoining sections of wattles a minimum of 6 in.

Installation of matting shall be in accordance with the detail provided in the plans, and in accordance with Article 1631-3 of the *Standard Specifications*, or in accordance with specifications provided elsewhere in this contract.

Apply PAM over the lower center portion of the coir fiber wattle where the water is going to flow over at a rate of 2 ounces per wattle, and 1 ounce of PAM on matting on each side of the wattle. PAM applications shall be done during construction activities after every rainfall event that is equal to or exceeds 0.50 in.

The Contractor shall maintain the coir fiber wattles until the project is accepted or until the wattles are removed, and shall remove and dispose of silt accumulations at the wattles when so directed in accordance with the requirements of Section 1630 of the *Standard Specifications*.

**Measurement and Payment**

*Coir Fiber Wattles* will be measured and paid for by the actual number of linear feet of wattles which are installed and accepted. Such price and payment will be full compensation for all work covered by this section, including, but not limited to, furnishing all materials, labor, equipment and incidentals necessary to install the *Coir Fiber Wattles*.

Matting will be measured and paid for in accordance with Article 1631-4 of the *Standard Specifications*, or in accordance with specifications provided elsewhere in this contract.

*Polyacrylamide(PAM)* will be measured and paid for by the actual weight in pounds of PAM applied to the coir fiber wattles. Such price and payment will be full compensation for all work covered by this section, including, but not limited to, furnishing all materials, labor, equipment and incidentals necessary to apply the *Polyacrylamide(PAM)*.

Payment will be made under:

<b>Pay Item</b>	<b>Pay Unit</b>
Polyacrylamide(PAM)	Pound
Coir Fiber Wattle	Linear Foot

**SILT FENCE COIR FIBER WATTLE BREAK:**  
(8-21-12) 1605,1630

**Description**

Silt fence coir fiber wattle breaks are tubular products consisting of coir fibers (coconut fibers) encased in coir fiber netting and used in conjunction with temporary silt fence at the toe of fills to

intercept runoff. Silt fence coir fiber wattle breaks are to be placed at locations shown on the plans or as directed. Installation shall follow the detail provided in the plans and as directed. Work includes furnishing materials, installation, maintenance and removing Silt fence coir fiber wattle breaks.

### **Materials**

Coir fiber wattle shall meet the following specifications:

100% Coir (Coconut) Fibers	
Minimum Diameter	12"
Minimum Length	10 ft
Minimum Density	3.5 lb/cf $\pm$ 10%
Net Material	Coir Fiber
Net Openings	2" x 2"
Net Strength	90 lb.
Minimum Weight	2.6 lb/ft $\pm$ 10%

Stakes shall be used as anchors. Provide hardwood stakes a minimum of 2-ft long with a 2" x 2" nominal square cross section. One end of the stake shall be sharpened or beveled to facilitate driving down into the underlying soil.

Provide staples made of 0.125" diameter new steel wire formed into a U-shape not less than 12" in length with a throat of 1" in width.

### **Construction Methods**

Excavate a trench the entire length of each wattle with a depth of 1" to 2" for the wattle to be placed. Secure silt fence coir fiber wattle breaks to the soil by wire staples approximately every linear foot and at the end of each wattle. Install at least 4 stakes on the downslope side of the wattle with a maximum spacing of 2 linear feet and according to the detail. Install at least 2 stakes on the upslope side of the silt fence coir fiber wattle break according to the detail provided in the plans. Drive stakes into the ground at least 10" with no more than 2" projecting from the top of the wattle. Drive stakes at an angle according to the detail provided in the plans.

Install temporary silt fence in accordance with Section 1605 of the *Standard Specifications* and overlap each downslope side of silt fence wattle break by 6".

Maintain the silt fence coir fiber wattle breaks until the project is accepted or until the silt fence coir fiber wattle breaks are removed, and remove and dispose of silt accumulations at the silt fence coir fiber wattle breaks when so directed in accordance with Section 1630 of the *Standard Specifications*.

**Measurement and Payment**

*Coir Fiber Wattle* will be measured and paid as the actual number of linear feet of wattles installed and accepted. Such price and payment will be full compensation for all work covered by this provision, including, but not limited to, furnishing all materials, labor, equipment and incidentals necessary to install the silt fence coir fiber wattle break.

Payment will be made under:

<b>Pay Item</b>	<b>Pay Unit</b>
Coir Fiber Wattle	Linear Foot

**TEMPORARY ROCK SILT CHECK TYPE A WITH EXCELSIOR MATTING AND POLYACRYLAMIDE (PAM):**

**Description**

Temporary Rock Silt Checks Type A with Excelsior Matting and Polyacrylamide (PAM) are devices utilized in temporary and permanent ditches to reduce runoff velocity and incorporate PAM into the construction runoff to increase settling of sediment particles and reduce turbidity of runoff. Temporary Rock Silt Checks Type A with Excelsior Matting and PAM are to be placed at locations shown on the plans or as directed. Installation shall follow the detail provided in the plans and as directed. Work includes furnishing materials, installation of Temporary Rock Silt Checks Type A, matting installation, PAM application, and removing Temporary Rock Silt Checks Type A with Excelsior Matting and PAM.

**Materials**

Structural stone shall be class B stone that meets the requirements of Section 1042 of the *Standard Specifications* for Stone for Erosion Control, Class B.

Sediment control stone shall be #5 or #57 stone, which meets the requirements of Section 1005 of the *Standard Specifications* for these stone sizes.

Matting shall meet the requirements of Excelsior Matting in Subarticle 1060-8(B) of the *Standard Specifications*, or shall meet specifications provided elsewhere in this contract.

Polyacrylamide (PAM) shall be applied in powder form and shall be anionic or neutrally charged. Soil samples shall be obtained in areas where the Temporary Rock Silt Checks Type A with Excelsior Matting and PAM will be placed, and from offsite material used to construct the roadway, and analyzed for the appropriate PAM flocculant to be utilized with each Temporary Rock Silt Check Type A. The PAM product used shall be listed on the North Carolina Department of Environmental Quality Division of Water Resources web site as an approved PAM product for use in North Carolina.

**Construction Methods**

Temporary Rock Silt Checks Type A shall be installed in accordance with Subarticle 1633-3(A) of the *Standard Specifications*, Roadway Standard Drawing No. 1633.01 and the detail provided in the plans.

Installation of matting shall be in accordance with the detail provided in the plans, and anchored by placing Class B stone on top of the matting at the upper and lower ends.

Apply PAM at a rate of 4 ounces over the center portion of the Temporary Rock Silt Checks Type A and matting where the water is going to flow over. PAM applications shall be done during construction activities and after every rainfall event that is equal to or exceeds 0.50 in.

The Contractor shall maintain the Temporary Rock Silt Checks Type A with Excelsior Matting and PAM until the project is accepted or until the Temporary Rock Silt Checks Type A with Excelsior Matting and PAM are removed, and shall remove and dispose of silt accumulations at the Temporary Rock Silt Checks Type A with Excelsior Matting and PAM when so directed in accordance with the requirements of Section 1630 of the *Standard Specifications*.

**Measurement and Payment**

*Temporary Rock Silt Checks Type A* will be measured and paid for in accordance with Article 1633-5 of the *Standard Specifications*, or in accordance with specifications provided elsewhere in this contract.

Matting will be measured and paid for in accordance with Article 1631-4 of the *Standard Specifications*, or in accordance with specifications provided elsewhere in this contract.

*Polyacrylamide(PAM)* will be measured and paid for by the actual weight in pounds of PAM applied to the Temporary Rock Silt Checks Type A. Such price and payment will be full compensation for all work covered by this section, including, but not limited to, furnishing all materials, labor, equipment and incidentals necessary to apply the *Polyacrylamide(PAM)*.

Payment will be made under:

<b>Pay Item</b>	<b>Pay Unit</b>
Polyacrylamide(PAM)	Pound

**COIR FIBER MAT:**

**Description**

Furnish material, install and maintain coir fiber mat in locations shown on the plans or in locations as directed. Work includes providing all materials, excavating and backfilling, and placing and securing coir fiber mat with stakes, steel reinforcement bars or staples as directed.

**Materials**

<b>Item</b>	<b>Section</b>
Coir Fiber Mat	1060-14

Anchors: Stakes, reinforcement bars, or staples shall be used as anchors.

**Wooden Stakes:**

Provide hardwood stakes 12"- 24" long with a 2" x 2" nominal square cross section. One end of the stake must be sharpened or beveled to facilitate driving through the coir fiber mat and down into the underlying soil. The other end of the stake needs to have a 1"- 2" long head at the top with a 1"- 2" notch following to catch and secure the coir fiber mat.

**Steel Reinforcement Bars:**

Provide uncoated #10 steel reinforcement bars 24" nominal length. The bars shall have a 4" diameter bend at one end with a 4" straight section at the tip to catch and secure the coir fiber mat.

**Staples:**

Provide staples made of 0.125" diameter new steel wire formed into a *u* shape not less than 12" in length with a throat of 1" in width.

**Construction Methods**

Place the coir fiber mat immediately upon final grading. Provide a smooth soil surface free from stones, clods, or debris that will prevent the contact of the mat with the soil. Unroll the mat and apply without stretching such that it will lie smoothly but loosely on the soil surface.

For stream relocation applications, take care to preserve the required line, grade, and cross section of the area covered. Bury the top slope end of each piece of mat in a narrow trench at least 6 in. deep and tamp firmly. Where one roll of matting ends and a second roll begins, overlap the end of the upper roll over the buried end of the second roll so there is a 6 in. overlap. Construct check trenches at least 12 in. deep every 50 ft. longitudinally along the edges of the mat or as directed. Fold over and bury mat to the full depth of the trench, close and tamp firmly. Overlap mat at least 6 in. where 2 or more widths of mat are installed side by side.

Place anchors across the mat at the ends approximately 1 ft. apart. Place anchors along the outer edges and down the center of the mat 3 ft. apart.

Adjustments in the trenching or anchoring requirements to fit individual site conditions may be required.



**Measurement and Payment**

*Coir Fiber Mat* will be measured and paid for as the actual number of square yards measured along the surface of the ground over which coir fiber mat is installed and accepted.

No measurement will be made for anchor items.

Payment will be made under:

<b>Pay Item</b>	<b>Pay Unit</b>
Coir Fiber Mat	Square Yard

**CONCRETE WASHOUT STRUCTURE:**  
(12-05-16)

**Description**

Concrete washout structures are enclosures above or below grade to contain concrete waste water and associated concrete mix from washing out ready-mix trucks, drums, pumps, or other equipment. Concrete washouts must collect and retain all the concrete washout water and solids, so that this material does not migrate to surface waters or into the ground water. These enclosures are not intended for concrete waste not associated with wash out operations.

The concrete washout structure may include constructed devices above or below ground and or commercially available devices designed specifically to capture concrete waste water.

**Materials**

<b>Item</b>	<b>Section</b>
Temporary Silt Fence	1605

*Safety Fence* shall meet the specifications as provided elsewhere in this contract.

Geomembrane basin liner shall meet the following minimum physical properties for low permeability; it shall consist of a polypropylene or polyethylene 10 mil thick geomembrane. If the minimum setback dimensions can be achieved the liner is not required. (5 feet above groundwater, 50 feet from top of bank of perennial stream, other surface water body, or wetland.)

**Construction Methods**

Build an enclosed earthen berm or excavate to form an enclosure in accordance with the details and as directed.

Install temporary silt fence around the perimeter of the enclosure in accordance with the details and as directed if structure is not located in an area where existing erosion and sedimentation control devices are capable to containing any loss of sediment.

Post a sign with the words “Concrete Washout” in close proximity of the concrete washout area, so it is clearly visible to site personnel. Install safety fence as directed for visibility to construction traffic.

The construction details for the above grade and below grade concrete washout structures can be found on the following web page link:

[http://www.ncdot.gov/doh/operations/dp\\_chief\\_eng/roadside/soil\\_water/details/](http://www.ncdot.gov/doh/operations/dp_chief_eng/roadside/soil_water/details/)

[Alternate details for accommodating concrete washout may be submitted for review and approval.](#)

[The alternate details shall include the method used to retain and dispose of the concrete waste water within the project limits and in accordance with the minimum setback requirements.](#) (5 feet above groundwater, 50 feet from top of bank of perennial stream, other surface water body, or wetland.)

### **Maintenance and Removal**

Maintain the concrete washout structure(s) to provide adequate holding capacity plus a minimum freeboard of 12 inches. Remove and dispose of hardened concrete and return the structure to a functional condition after reaching 75% capacity.

Inspect concrete washout structures for damage and maintain for effectiveness.

Remove the concrete washout structures and sign upon project completion. Grade the earth material to match the existing contours and permanently seed and mulch area.

### **Measurement and Payment**

*Concrete Washout Structure* will be paid for per each enclosure installed in accordance with the details. If alternate details are approved then those details will also be paid for per each approved and installed device.

*Temporary Silt Fence* will be measured and paid for in accordance with Article 1605-5 of the *Standard Specifications*.

No measurement will be made for other items or for over excavation or stockpiling.

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Payment will be made under:

**Pay Item**  
Concrete Washout Structure

**Pay Unit**  
Each

# SPECIAL PROVISIONS FOR RAILROAD ROADBED GRADING AND DRAINAGE

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Corey P. Vernier  
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5/3/2018

**RAILROAD ROADBED**

The Standard Specifications for Roads and Structures, January 2018 of the North Carolina Department of Transportation, hereinafter referred to as the *Standard Specifications*, shall apply to the articles of the Project Special Provisions. Norfolk Southern Standard Specifications for Materials and Construction, November 2017, is applicable for items not addressed in these Special Provisions or the *NCDOT 2018 Standard Specifications*. If discrepancies are found between the referenced specifications, the Contractor shall default to the more stringent requirements, as determined by the Engineer. All discrepancies shall be submitted to the Engineer for review and resolution within 14 days after contract notice to proceed. In accordance with the Contractor Work Plan Special Provisions herein, the railroad roadbed access, construction and maintenance shall be addressed in detail by the Contractor, for review and concurrence by the Engineer.

**MAINTENANCE OF RAILROAD ROADBED***Add to End of 104-10 of 2018 Standard Specifications*

The Contractor shall be responsible for the maintenance of the track roadbed during the construction period. Ditches and temporary pipes shall be provided and maintained as may be necessary to satisfactorily drain the sub-grade. Where preliminarily accepted sub-grade or sub-ballast is damaged or contaminated by natural causes, hauling equipment or other traffic, the Contractor shall restore the sub-grade to the required lines, grades, typical sections and to the required density, as directed by the Engineer, at no additional delay or cost to the Department. At the direction of the Engineer, remedies may include removal and replacement of contaminated or segregated sub-ballast materials. There will be no direct payment for maintenance of the track roadbed or for the installation of additional temporary erosion control measures. All cost associated with maintaining the track roadbed will be incidental to other items of work.

The Contractor shall maintain positive site drainage away from existing rail facilities to the maximum extent possible at all times. Ground surfaces will be prepared for rain events by the end of each day. Contractor will maintain existing drainage patterns until the proposed drainage patterns have been established to the proposed outfall. Contractor will promptly remediate any drainage issues directed by the Engineer and will be responsible for all costs associated with remediation of areas damaged by lack of positive drainage.

Unless otherwise approved by the Engineer, final acceptance of railroad roadbed will not occur until the end of the project. Completion of preliminary punchlist items will not constitute final acceptance. The Contractor shall notify the Engineer, including submission of documentation, of damage to the railroad roadbed after preliminary punchlists have been completed. In the event that final acceptance of an area is granted by the Engineer prior to the end of the project, any form of access to the area by the Contractor, or any party under the charge or direction of the Contractor, will render the acceptance invalid in the vicinity of the area.

No additional compensation shall be made for rework to accepted areas that have been compacted, proof rolled and accepted including, but not limited to, the initial list of the embankment, the top of the sub-grade and the top of the sub-ballast.

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The Cost of Maintenance of Railroad Roadbed shall be incidental to items of work being maintained.

Failure to comply with these additional measures will be subject to the stipulations outlined in Section 105-16 in the *2018 Standard Specifications*.

### **CLEARING AND GRUBBING - METHOD III**

Perform clearing on this project to the limits established by Method "III" shown on Standard

Drawing No. 200.03 of the 2018 Roadway Standard Drawings except that grubbing will be performed on all cleared excavation and embankment areas and will include all stumps, roots and other embedded debris. All debris from the clearing and grubbing operations, including stumps and roots, shall be stockpiled, disposed of and/or reused according to the Ownership of Materials Plan.

Conventional clearing methods may be used except where permit drawings or conditions have been included in the proposal which require certain areas to be cleared by hand methods.

### **BURNING RESTRICTIONS**

Open burning is not permitted on any portion of NCDOT property, NCDOT right-of-way, railroad right-of-way or City of Charlotte street right-of-way. Do not burn the clearing, grubbing or demolition debris designated for disposal and generated from the project at locations within the project limits, off the project limits or at any waste or borrow sites. Stockpile, dispose of and/or re-use clearing, grubbing and demolition debris by means other than burning, as specified in Ownership of Materials Plan.

### **OWNERSHIP OF MATERIALS PLAN**

The Contractor shall submit a plan to recycle, reuse or dispose solid waste materials according to Section 104-13, "RECYCLED PRODUCTS OR SOLID WASTE MATERIALS".

The Ownership of Materials Plan shall differ from Section 104-13 in the following ways:

- It will be a required submittal and shall include all of the overall workplan submittals to the Railroad.
- The targeted materials identified in the first paragraph of 104-13 shall also include the following but not limited to:
  - Railroad Materials:
    - Running rail (to be arranged uniformly in a pile)
    - Timber ties (to be neatly stacked)
    - Spikes; lag screws; plates, clips and Other Track Material (OTM) (each in their own respective piles)
    - Signal cable; conduit
    - Track Ballast
  - Non-Railroad Materials:
    - Gravel 3/4" and larger which is potentially suitable for structural fill

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- Soil that is not suitable for structural fill
- Inert construction materials
- Miscellaneous construction debris
- The Contractor shall include the areas where the stockpiles will be staged in their workplan and shall keep those areas available for this use until demolition operations have ceased or as otherwise approved by the Engineer.

Additionally, all salvaged material originally furnished by the Department's Contractor, determined to be disposed of according to the Ownership of Materials Plan, shall remain the property of the Contractor, and shall be given consideration when making the bid. All salvaged track materials owned by the Department's Contractor shall be disposed of by the Contractor, and the construction area shall be left in a neat and/orderly condition.

All salvaged materials to be reused shall remain in their own stockpiles, as noted, unless directed otherwise by the Engineer.

All salvaged track material either existing or furnished by NSR is and shall remain the property of the NSR except as noted in the *Railroad Track to be Removed* section of the Special Provisions. Materials allowed to co-mingle with materials covered by Railroad retention policies will become subject to Railroad policies, at no additional cost to the department.

If discrepancies exist between this section and 104-13 or other sections in these Railroad Special Provisions, this section shall govern over them.

The cost of implementing and maintaining this plan shall be incidental to the Clearing and Grubbing pay item of the contract.

**MINOR DRAINAGE STRUCTURES****Description**

The Contractor shall furnish and construct minor drainage structures (including pipe collars) at locations shown on the plans.

**Materials**

Materials shall be in accordance with Section 840-2 of the *Standard Specifications*, except the Contractor shall not use Class B concrete or masonry to construct minor drainage structures (including pipe collars) located on NCDOT property, NCDOT right-of-way or railroad right-of-way. Minor drainage structures located on NCDOT property, NCDOT right-of-way or railroad right-of-way, cast-in-place or precast, shall be constructed of Class AA concrete. These structures shall be designed by the Contractor to accommodate Cooper E-80 loading with Diesel Impact. These designs shall be submitted to the Engineer for approval prior to ordering materials or commencing construction of these structures.

Minor drainage structures located on City of Charlotte street right-of-way shall be constructed in accordance with Section 840-2 of the *Standard Specifications*,

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**REMOVAL OF EXISTING ASPHALT PAVEMENT**

This work shall be performed in accordance with Section 250, "REMOVAL OF EXISTING PAVEMENT" of the *Standard Specifications* except for existing asphalt pavement located within the footprint of proposed embankments. Existing asphalt pavement located within the footprint of proposed embankments shall be removed and disposed of properly in accordance with *Removal of Existing Asphalt Pavement*.

Payment will be made under:

**Pay Item**

Removal of Existing Asphalt Pavement

**Pay Unit**

Square Yard

**EXCAVATION**

This work shall be performed in accordance with Section 225, "ROADWAY EXCAVATION" of the *Standard Specifications*. The applicable typical roadbed template will be maintained throughout the railway portion of the project.

For excavated material to be wasted in stockpiles on railroad right-of-way, the Contractor shall submit the proposed location and dimensions of the stockpiles for approval by the Engineer prior to excavating the material. The Contractor shall not haul excavated material off-site without prior approval from the Engineer.

**EXCAVATION ADJACENT TO ACTIVE TRACK**

Excavation within Zone 1, Zone 2 and Zone 4 under the hard pan layer as defined in the 'Excavation Adjacent to Active Track' detail in the plans shall be conducted in lengths adjacent to active track no greater than 100'. Multiple areas of excavation in Zones 1 and 2 shall also be no closer than 300', or as permitted by the railroad representative. If unsuitable material is encountered, the Contractor shall undercut the unsuitable material and backfill with a suitable material in a continuous manner as prescribed by the Engineer. Undercut areas left open overnight will not be permitted. The limits of undercut shall then be proof rolled per Section 260 of the *Standard Specifications* prior to closing up the excavation. Construction activities requiring excavation adjacent to active track shall occur in a continuous fashion until completed. Unless otherwise approved by the Engineer, excavation adjacent to the track cannot be performed without the presence of an approved Norfolk Southern Employee in Charge (EIC) or Roadway Worker in Charge (RWIC).

**PROOF ROLLING**

Proof Rolling per Section 260, "PROOF ROLLING" of the *2018 Standard Specifications* shall be performed prior to the initial lift of embankment, on the finished subgrade, and on the finished sub-ballast.



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Proof rolling of subgrade surface will not be required where the subgrade surface is rock cut; where, in the opinion of the Engineer, proof rolling would be detrimental to the work; where the proof roller will approach a culvert, pipe or other conduit closer than five feet in any direction; or where the proof roller may damage adjacent work due to restrictions in available access and for maneuvering space.

### **EMBANKMENT**

The placement and compaction of embankment work shall be performed in accordance with Section 235, "EMBANKMENTS" of the *Standard Specifications* and as follows:

All earth fills shall be made in uniform layers of not more than 6" thick after compaction. Rock may be placed in compacted layers of not more than 24" thick. Each fully compacted layer shall extend the full width of the cross section. Each layer shall be free from mud, snow, ice or excessive (standing) water before a subsequent layer is placed. Excessive lift thickness will be grounds for rejection and/or requirement that Contractor provide survey of lifts to verify thickness for the whole lift area. If required by the Engineer, surveys of lift thickness shall be conducted up to every 25' along the alignment and up to every 5' perpendicular to the alignment at no additional cost to the Department.

Sandy or rocky material shall be spread in full width layers to form drainage planes from the center through the edge of the embankment. Pockets of open materials surrounded by more impervious material shall be avoided. No bridge lifts shall be used.

Embankments shall be formed with suitable materials from on-site cuts and/or necessary suitable material from borrow pits. Organic material such as brush, stumps, roots and trees or other perishable items shall not be placed in embankments. Coal or organic shale shall not be included in the embankment. Bituminous material shall not be used in railroad embankment. In addition to requirements for all embankment material, embankment material placed within zones 1, 2, 3, and 4 as shown on Sheet 2S, Excavation Adjacent to Active Track, shall also minimally meet the requirements of section 1016, class III select material. In fill sections, after stripping the topsoil and/organic material, the entire area on which the embankment is to be placed shall be plowed, scarified, and compacted for a minimum depth of 6". After compaction, the contractor shall proof roll the existing subgrade to ascertain the stability of the existing subgrade and to locate deficiencies requiring correction. If deficiencies are found in the existing subgrade, the Engineer shall determine the appropriate corrective measures. The initial lift and all future fill layers shall be compacted to 95% of maximum density per Standard Proctor in accordance with ASTM D698-T and AASHTO T 99, or 90% of maximum density per Modified Proctor in accordance with ASTM D-1557/AASHTO T180, except that a minimum of the top **2' of fill shall be compacted to 100% Standard Proctor.**

The top 12" of the subgrade in all cut sections that will be cut to subgrade elevation shall be plowed, scarified and compacted to 100% Standard Proctor. The Engineer shall determine the AASHTO test method to be used after review of the soil analysis.

The Contractor shall notify the Engineer when fill layers are ready for compaction testing. Successive layers shall not be placed prior to an acceptable density being obtained on each layer. The moisture content of the soil shall be controlled as necessary to obtain the specified densities based upon the optimum moisture content for each material. Water shall be added to the soil when,

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in the opinion of the Engineer, additional moisture may be necessary to obtain the specified density. Soil that is too wet shall be allowed to dry or be worked by plowing, discing, harrowing, or other means to dry the material to a workable moisture content.

In the event a specified density is not obtained, the Engineer may order additional rolling, watering, or drying of the soil as necessary to obtain the specified density. Fill layers not meeting a specified density after additional working shall be removed and new material shall be placed and compacted to the specified density at no cost to the Department.

If there is hardpan or other existing embankment that is better left in current state, the Contractor shall notify the Engineer for direction on whether or not to use the existing feature.

The Department reserves the right to perform additional density tests at its discretion. The Contractor shall expect the Department to perform density tests on each lift. The Department will not consider additional compensation or time for delays due to additional testing.

The Contractor shall submit a spreadsheet identifying the proposed elevation and offset of the subgrade crown or otherwise highest point at even 50' stations along with the staking diaries. The spreadsheet shall be developed in a format provided by the Engineer.

If discrepancies exist between this section and 235, 260 or other sections in these Railroad Roadbed Special Provisions, this section shall govern over them.

All costs associated with the requirements above shall be included in the unit contract price for the *Borrow Excavation*. Unless otherwise approved by the Engineer, sub-ballast material used for fill, at or below finished subgrade elevation of the embankment, will also be compensated by the borrow excavation contract price.

## **SUB-BALLAST**

### **DESCRIPTION**

The Contractor will furnish and place sub-ballast as shown in the plans. The sub-ballast shall be placed after the subgrade has been graded, compacted and accepted.

### **MATERIALS**

The sub-ballast shall meet the following requirements and the gradation shown in Table 1:

- Sub-ballast shall be produced from sound rock meeting the gradations shown in Table 1 (AASHTO T 27 and T 11, AASHTO T 88 as modified for Base Course and Stabilizer).
- The material shall be free from organics and deleterious material (AASHTO T 112).
- The material shall not have a Liquid Limit (LL) in excess of 25 (AASHTO T 89) or a Plasticity Index (PI) in excess of 6 (AASHTO T 90).
- The material shall have a percentage of wear (LA Abrasion, AASHTO T 96) no greater than 50%.

- The material shall meet NCDOT's soundness requirements (AASHTO T 104).

**Table 1 Sub-ballast**

	Percent Passing Standard Sieve Size by Weight					
Sieve Size	2"	1"	3/8"	#10	#40	#200
Sub-ballast	100	90-100	50-84	26-50	12-30	5-12

## CONSTRUCTION METHODS

After the subgrade has been finished to proper grade and cross-section, the sub-ballast shall be placed on the subgrade with an approved mechanical spreader (box spreader or paver) capable of placing the material in a uniform loose depth and without segregation, except for areas inaccessible to a mechanical spreader. For areas deemed by the Engineer to be inaccessible to a mechanical placement method the aggregate material may be placed by other methods approved by the Engineer. The sub-ballast section shall be constructed in two layers of equal thickness. Each layer of sub-ballast shall be fully compacted in lifts no less than 3" in thickness and no greater than 6.5" in thickness after compaction. Excessive lift thickness will be grounds for rejection and/or requirement that Contractor provide survey of lifts to verify thickness for the whole lift area. If required by the Engineer, surveys of lift thickness shall be conducted up to every 5' along the alignment and up to every 5' perpendicular to the alignment at no additional cost to the Department.

Each layer of sub-ballast shall be compacted to a density of 100% of the Standard Proctor determined by ASTM D698 and AASHTO T 99 and maintained to the required cross-section during compaction. Moisture content shall be maintained within 2% +/- of optimum moisture to obtain the desired density. Water shall be added to the material if necessary to obtain the desired density. If the material is too wet to obtain the desired density, the material shall be worked by discing, harrowing or other means to dry the material to a workable moisture content.

Prior to sub-ballast placement, the Contractor shall submit a spreadsheet identifying the proposed elevation and offset of the sub-ballast crown or otherwise highest point at even 50' stations. The spreadsheet shall be developed in a format provided by the Engineer. Any sub-ballast sections thinner than the thickness indicated in this spreadsheet shall be removed and replaced at the minimum section thickness. Additional sub-ballast placement due to low subgrade shall be paid for as subgrade material.

If sub-ballast becomes contaminated before sub-ballast acceptance, or after sub-ballast acceptance due to Contractor operations, the Contractor will repair and /or replace at no cost to the Department. The Contractor shall protect the accepted sub-ballast from contamination as described in Maintenance of Railroad Roadbed.

After completed roadbed has been accepted and turned over to Norfolk Southern for track construction, the Contractor shall not use the roadbed for access.

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**MEASUREMENT AND PAYMENT**

The quantity for *Sub-ballast* to be paid for will be the actual number of tons of sub-ballast which has been used to construct the track roadbed sections, measured as provided for in Article 520-11 of the *Standard Specifications*. Such price and payment will be in full compensation for all furnishing, weighing, hauling, and placing of sub-ballast and for any other work necessary for the construction of the track roadbed section.

<b>Pay Item</b>	<b>Pay Unit</b>
Sub-ballast	Ton

**RAILROAD TRACK TO BE REMOVED**

The Department's Contractor shall remove existing track as shown in the plans and dispose of the materials per the Ownership of Materials Plan.

**DESCRIPTION**

Furnish the labor, materials, tools and equipment necessary to remove the existing track (including turnouts) which includes the rail, crossties, tie plates, anchors, spikes and disposal of the materials.

**MEASUREMENT AND PAYMENT**

*Railroad Track to be Removed* will be measured and paid for the actual number of track feet of track which is acceptably removed, measured between the rails along the center line of the track prior to the track being removed.

*Crosstie Disposal* will be measured and paid for the actual number of individual crossties removed and disposed of at a NSR approved facility. The Contractor shall furnish certificates of delivery to the Department.

Payment will be made under:

<b>Pay Item</b>	<b>Pay Unit</b>
Railroad Track to be Removed	Track Foot
Crosstie Disposal	Each

**GATE****DESCRIPTION**

Furnish and erect gates in conformity with the details shown in the plans and at the locations shown in the plans.

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**MATERIALS****Item Section**

2" OD galvanized steel pipe, schedule 80

4" OD galvanized steel pipe, schedule 80

Fittings and Accessories as shown

Use Class B concrete for anchors. Instead of Class B concrete, pre-mixed commercially bagged dry concrete mix may be used if the concrete meets the minimum strength requirements for Class B concrete when mixed with the quantity of water shown on the instructions printed on the bag.

**CONSTRUCTION METHODS****Setting Posts and Braces**

Set posts in concrete anchors to maintain the position and alignment of the post as shown in the details in the plans. Forms are not required for the concrete. Trowel the top of the concrete to a smooth finish and slope to drain away from the post. The concrete anchors require at least a 3-day curing period before any load is placed on the post.

**MEASUREMENT AND PAYMENT**

*Gate* will be measured and paid for the number of gates actually erected on the project.

The above prices and payments will be in full compensation for all work covered by this provision including but not limited to furnishing concrete, steel pipe, hardware and all other materials; fabrication, painting and erection of the right of way gates; and incidentals necessary to complete the work as shown on the plans.

**Pay Item**

Gate

**Pay Unit**

Each

**8" UNDERDRAIN****DESCRIPTION**

Construct and install underdrain pipes and riser pipes in accordance with the detail drawing in the plans and requirements of the contract.

**MATERIALS**

Refer to Division 10 of the *Standard Specifications*.

**Item**

Shoulder Drain Aggregate, No. 57 Stone

8" HDPE AASHTO M294 TYPE S

Geotextile for Subsurface Drains, Type 1

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Material for the underdrain pipe and fittings shall be 8" HDPE conforming to AASHTO M294 Type S. The 8" HDPE shall be perforated and the perforation size and spacing shall conform to ASTM C 444, Type 1.

### **CONSTRUCTION METHODS**

Excavate the trench to the width, line and grade as shown in the plans.

Place the geotextile in accordance with the detail in the plans. Do not leave fabric uncovered for more than 7 days. Install geotextile such that all splice joints are provided with a minimum overlap of 2'. Overlap the closure at the top of the trench at least 6 " and secure with mechanical ties. Where outlet pipe passes through the fabric, wrap a separate piece of fabric around the outlet pipe, flare against the side of the filled drain, and secure with anchor pins.

Anchor field splices of geotextile with anchor pins to ensure that required overlap is maintained.

Place 3" of the subdrain course aggregate as shown in the detail in the plans. Lay perforated pipe with the perforations down. Perform the remainder of the aggregate placement operations to prevent damage to the geotextile and pipe. Replace damaged sections of geotextile and pipe at no cost to the Department.

Place underdrain risers at the terminal end of the underdrain run and at every 350' minimum or where there is a horizontal or vertical change in alignment. In locations where the underdrain cleanouts are located under the proposed platform, the 45-degree bends and riser pipe shall be orientated in a manner that offsets the riser pipe so that the center of the cover is 6' from the centerline of the closest track.

Use solvent cement to bond the pipe and fittings together. Obtain approval for all pipe fittings from the Engineer prior to delivery. Protect the open end of riser pipes with a secure cover that can be opened/temporarily removed to facilitate cleanout of the underdrain pipe.

Establish positive drainage within 72 hours of beginning trenching for installation of a given section of underdrain. Failure to comply with this requirement may result in the Engineer restricting installation of additional sections of aggregate subsurface drain/shoulder drain until such time as the Contractor completes appropriate outlet installations.

Compact the aggregate to a degree acceptable to the Engineer by the use of a vibratory compactor before making the geotextile closure at the top of the trench.

Carefully place the #57 stone backfill material after the pipe has been laid and the geotextile is closed at the top, so that the pipe will not be disturbed by the backfilling operation. Compact the remainder of the backfill material (#57) stone to a degree acceptable to the Engineer by the use of a vibratory compactor.

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**MEASUREMENT AND PAYMENT**

8" Underdrain will be measured and paid for as the actual number of linear feet of underdrain that has been completed and accepted, measured to the nearest foot along the centerline of the completed underdrain pipe. The cost for labor and materials to furnish and install elbows, tees, risers and covers shall be included in the cost per linear foot of underdrain.

Such price and payment includes, but is not limited to, furnishing, hauling, and placing all subsurface drain pipe, fittings, aggregate, geotextile, and other materials; making all joint connections and all excavation and backfilling.

Payment will be made under:

**Pay Item**

8" Underdrain

**Pay Unit**

Linear Foot

**8" DRAINAGE PIPE**

This work shall be performed in accordance with Section 305, "DRAINAGE PIPE" of the *Standard Specifications* except the Contractor shall construct the 8" drainage pipe with HDPE (Type S) in accordance with Section 1032-7.

Joints shall consist of an integral flared bell and tapered spigot with rubber sealing gasket. All joints shall be soil-tight and shall conform to ASTM F2304. Rubber gaskets shall conform to ASTM F744. Fittings shall conform to ASTM D2321 and meet the structure performance of the pipe.

**RODENT SCREENS FOR HDPE PIPE CULVERTS**

The Contractor shall furnish secure rodent screens for the HDPE pipe culvert outlets at Sta. 20+96, Sta. 27+00 and Sta. 30+50. No separate payment will be made for the rodent screens as they shall be considered incidental to the corresponding HDPE pipe culvert pay item.

**ENDWALLS**

The work shall be performed in accordance with Section 838, "Endwalls", of the *Standard Specifications*, except that the Contractor shall not use Class B concrete or masonry to construct plain or reinforced endwalls located on NCDOT property, NCDOT right-of-way or railroad right-of-way. All endwalls located on NCDOT property, NCDOT right-of-way or railroad right-of-way, cast-in-place or precast, shall be constructed of Class AA concrete.

**SURGE STONE STABILIZATION****DESCRIPTION**

The work covered by these provisions consists of providing soil stabilization when soft/unstable soil is encountered during embankment and/or sub-ballast construction of adjacent to the tracks

and undercut with suitable fill is infeasible as deemed by the Engineer, the Contractor shall furnish materials, labor, equipment and incidentals necessary to perform surge stone stabilization.

## MATERIALS

Surge Stone:

- A. The aggregate shall be a quarried stone of sound quality either shot and/or crushed.
- B. The aggregate shall meet the following gradation:

SIEVE SIZE	% Passing by Weight
6 in (150mm)	100
2 in (50mm)	25 – 75
No. 10 (2mm)	15 – 35

- C. Ensure the Surge Stone does not contain soil or decomposed rock.
- D. The material shall meet NCDOT's soundness requirements (AASHTO T 104).
- E. Surge Stone will be accepted after a visual inspection of the material to ensure proper gradation has been achieved.

## CONSTRUCTION METHODS

In conjunction with clearing and grubbing activities, the Contractor shall identify soft areas due to high moisture and install temporary ditches to provide positive drainage and dewatering devices and allow this area to drain for a period of no less than three weeks, or as determined by the Engineer prior to commencing further excavation embankment or surge stone stabilization.

Where soft or unsuitable soil is encountered during embankment construction, the Contractor shall undercut the area as directed by the Engineer. Areas requiring undercut of less than 5' shall be performed according to, and shall be paid for as part of the *Undercut Excavation* pay item. Backfilling material shall be as directed by the Engineer and shall be compacted as directed by the Engineer. The top layer of undercut backfill shall be placed at 1% minimum slope to drain away from the tracks and shall be proof rolled before placing the first lift of embankment material.

For areas requiring undercut of more than 5' deep, the Engineer may direct the Contractor to excavate to a proper depth, grade surficial soils to provide positive drainage, then backfill with surge stone with a maximum lift of 2' per lift or as deemed adequate by the Engineer. Surge stone shall be installed and compacted as directed by the Engineer.

Surge stone shall be placed, rolled and compacted in lieu of undercut in areas determined by the Engineer. After stripping the topsoil and/organic material from the fill section, surge stone shall be placed, rolled, and compacted until adequate stability for embankment construction has been achieved. If the first lift does not provide adequate stability, surge stone shall continue to be added until stability is achieved. In sections where surge stone is used, it shall be placed full-width in the



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embankment section to provide similar material throughout the cross-section and not create areas where water could become trapped in the embankment.

Once adequate stability is achieved, the Contractor shall cap the surge stone layer with a layer of sub-ballast no less than 12" deep or with a non-woven geotextile fabric prior to placing embankment material above. If the top of the surge stone layer is within 2' of the proposed sub-grade line, the Contract shall not place geotextile or embankment material between the surge stone layer and the sub-ballast layer and instead place and compact sub-ballast material according to the *Embankment* special provision.

## **MEASUREMENT AND PAYMENT**

*Surge Stone* will be measured and paid in tons of stone incorporated into the project. Measure stone by weighing in trucks on certified platform scales or other certified weighing devices. The contract unit price for *Surge Stone* will be in full compensation for furnishing, hauling, handling, placing, compacting and maintaining the aggregate.

Payment will be made under:

<b>Pay Item</b>	<b>Pay Unit</b>
Surge Stone	Ton

## **SELECT DEMOLITION OF EXISTING WALLS**

### **DESCRIPTION**

Demolish and dispose of portions of existing concrete sheet pile wall and concrete crib wall in accordance Section 210 within the limits listed below:

*Select Demolition of Concrete Sheet Pile Wall* from Sta. 11+64 to Sta. 13+11 to a minimum of two feet below the proposed sub-ballast elevation.

*Select Demolition of Crib Wall* from Sta. 39+96 to Sta. 40+60 to accommodate the installation of the proposed retaining wall in the same location.

### **CONSTRUCTION METHODS**

Submit detailed demolition workplans, including plans and sections of removal limits, to the Engineer for review and approval incorporate the construction methods included below

*Select Demolition of Concrete Sheet Pile Wall* from Sta. 11+64 to Sta. 13+11

Construct and compact proposed embankment in front of the existing wall to an elevation equal to that of the removal limits prior to any demolition. Remove coping is an approved method. Remove the existing concrete sheet pile wall including the coping and handrail to two feet below the proposed sub-ballast elevation by sawcutting or another approved method. Due to this wall's proximity to active track, the length of wall that can be removed at any given time prior to restoring the railroad embankment is subject to the requirements of "*Excavation Adjacent to Active Track*".

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*Select Demolition of Crib Wall* from Sta. 39+96 to Sta. 40+60

Remove the face of the existing crib wall within the given station limits to the extent necessary to accommodate pile driving for proposed retaining wall RW-5. Portions of the concrete tie-backs to be removed shall be removed by sawcutting or another approved method. The tie-backs shall not be pulled out of the existing railroad embankment.

If demolition operations encounter contaminated materials, temporarily discontinue operations in the vicinity of the contamination and do not resume until directed by the Engineer.

### **MEASUREMENT AND PAYMENT**

The price and payment below will include full compensation for selectively demolishing, removing, handling, hauling and proper disposal of removed materials.

*Select Demolition of Concrete Sheet Pile Wall* will be paid at the contract lump sum price.

*Select Demolition of Crib Wall* will be paid at the contract lump sum price.

Payment will be made under:

<b>Pay Item</b>	<b>Pay Unit</b>
Select Demolition of Concrete Sheet Pile Wall	Lump Sum
Select Demolition of Crib Wall	Lump Sum

### **EARTH MOUND**

#### **DESCRIPTION**

Earth mound to be placed and installed as shown in detail drawing in the plans and requirements of the contract except as described below.

#### **MATERIALS**

Aggregate, No. 2A Stone

#### **Section**

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### **CONSTRUCTION METHODS**

Starting at the level of the sub-ballast, place and compact the earth mound in 6" lifts and consolidate using conventional compaction techniques to a degree acceptable to the Engineer.

Shape the aggregate earth mound according to the detail in the plans. The Contractor shall coordinate with the Engineer regarding the timing of the construction of the earth mound relative to when the existing track is taken out of service.

### **MEASUREMENT AND PAYMENT**

*Earth Mound* will be measured and paid in units of tons incorporated and accepted into the project. The contract unit price for *Earth Mound* will be in full compensation for furnishing, installing compacting to finished final shape the finished *Earth Mound*.

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Payment will be made under:

**Pay Item**

Earth Mound

**Pay Unit**

Ton

**RAILROAD SIGNAL CONDUIT**

**DESCRIPTION**

Install railroad signal conduit at the direction of the Engineer.

**MATERIALS**

All railroad signal conduit and fittings shall be orange 4” Schedule 80 PVC conforming to ASTM D1795. Factory made conduit bends or elbows shall be used whenever possible in making necessary changes in direction.

**CONSTRUCTION METHODS**

Contractor shall coordinate with the Engineer to determine if railroad signal conduit will be installed prior to initiating sub-ballast placement. If required, the Contractor shall install railroad signal conduit at the line, grade as directed by the railroad representative. Where open ends are to be left below grade for future tie-in by railroad forces, a cover shall be installed on the end of the conduit. Conduit trenches shall be backfilled and satisfactorily compacted per the “Embankment” section of these *Special Provisions* prior to beginning the sub-ballast placement. All conduits will be direct buried with a minimum of 36” of cover from the top of the sub ballast. The buried conduit shall have tracer tape to coincide with the type of signal cables run to allow for future locating.

The Contractor shall provide to the Engineer the locations of all buried conduit ends by station and offset.

**MEASUREMENT AND PAYMENT**

*Railroad Signal Conduit* will be measured and paid by the linear feet of conduit installed and accepted by the Engineer. The contract unit price for *Railroad Signal Conduit* will be in full compensation for furnishing, installing and backfilling of conduit, fittings and all incidentals required to complete the work.

Payment will be made under:

**Pay Item**

Railroad Signal Conduit

**Pay Unit**

Linear Foot

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**BORING INTO EXISTING 5'X5' BOX CULVERT AT -S1- STA. 15+08 (LT)**

Add the following to Section 310-6 of the *Standard Specifications*:

All work associated with the tie-in of the proposed 18" RC Pipe Culvert, Class III to the existing 5'x5' box culvert at -S1- Sta. 15+08 (LT), including temporary shoring design, installation, soil excavation, select demolition of existing drainage box, closure pour to connect the pipe to the box, backfilling and compaction with suitable material shall be incidental to the 18" RC Pipe Culvert, Class III pay item.

**TEMPORARY CHAIN LINK FENCE****DESCRIPTION**

Furnish and erect temporary chain link fence in accordance with Section 866 of the *Standard Specifications*.

**MATERIALS**

Construct temporary chain link fence with materials in accordance with Section 1050 of the *Standard Specifications* except that all components of the fence shall be fusion bonded black vinyl coated.

**CONSTRUCTION METHODS**

Construction of the temporary chain link fence shall be in accordance with Section 866 of the *Standard Specifications*. The fence shall be installed, as directed by the Engineer, along the boundary of the Temporary Construction Easement at Morehead St shown in the Plans and described elsewhere within these Special Provisions. Fasten the chain link fence to the existing fence on either end to the satisfaction of the Engineer.

**MEASUREMENT AND PAYMENT**

*Temporary Chain Link Fence, 60" Fabric* will be measured and paid in linear feet of fence measured in place from center of each post that has been completed and accepted.

Such price and payment includes, but is not limited to, clearing and grading; and furnishing and installing fence fabric, line and terminal posts, post braces, tie wires, stretcher bars, top rails, tension wire, concrete, and all other materials necessary to complete the temporary fence.

Payment will be made under:

**Pay Item**

Temporary Chain Link Fence, 60" Fabric

**Pay Unit**

LF

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**DECORATIVE FENCE RESET**

**DESCRIPTION**

Remove, store and reset in original location a portion of the existing decorative fence along Morehead St as directed by the Engineer.

**CONSTRUCTION METHODS**

Reset the existing decorative fence in accordance with Article 867-2 of the Standard Specifications and as directed by the Engineer.

**MEASUREMENT AND PAYMENT**

*Decorative Fence Reset* will be measured and paid in the linear feet of decorative fence that has been acceptably reset. Measurement will be made along the decorative fence after it has been reset from center of end post to center of end post.

Such price and payment includes, but is not limited to, removing, hauling, storing and re-erecting the existing decorative fence; and furnishing and installing any fence components unnecessarily damaged by the Contractor's forces.

Payment will be made under:

**Pay Item**

Decorative Fence Reset

**Pay Unit**

LF

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## APPENDIX A

Norfolk Southern – Special Provisions for Protection of Railway Interests (Aug 28, 2017)

### 1. AUTHORITY OF RAILROAD ENGINEER AND SPONSOR ENGINEER:

Norfolk Southern Railway Company, hereinafter referred to as “Railroad”, and their authorized representative shall have final authority in all matters affecting the safe maintenance of railroad traffic including the adequacy of the foundations and structures supporting the railroad tracks. For Public Projects impacting the Railroad, the Railroad’s Public Projects Engineer, hereinafter referred to as “Railroad Engineer”, will serve as the authorized representative of the Railroad.

The authorized representative of the Project Sponsor (“Sponsor”), hereinafter referred to as the “Sponsor’s Engineer”, shall have authority over all other matters as prescribed herein and in the Project Specifications.

The Sponsor’s Prime Contractor, hereinafter referred to as “Contractor” shall be responsible for completing any and all work in accordance with the terms prescribed herein and in the Project Specifications. These terms and conditions are subject to change without notice, from time to time in the sole discretion of the Railroad. Contractor must request from Railroad and follow the latest version of these provisions prior to commencing work.

### 2. NOTICE OF STARTING WORK:

A. The Contractor shall not commence any work on railroad rights-of-way until he has complied with the following conditions:

1. Signed and received a fully executed copy of the required Norfolk Southern Contractor Right of Entry Agreement.
2. Given the Railroad written notice in electronic format to the Railroad Engineer, with copy to the Sponsor’s Engineer who has been designated to be in charge of the work, at least ten days in advance of the date he proposes to begin work on Railroad rights-of-way.
3. Obtained written approval from the Railroad of Railroad Protective Liability Insurance coverage as required by paragraph 14 herein. It should be noted that the Railroad does not accept notation of Railroad Protective insurance on a certificate of liability insurance form or Binders as Railroad must have the full original countersigned policy. Further, please note that mere receipt of the policy is not the only issue but review for compliance. Due to the number of projects system-wide, it typically takes a minimum of 30-45 days for the Railroad to review.

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4. Obtained Railroad's Flagging Services as required by paragraph 7 herein.
  5. Obtained written authorization from the Railroad to begin work on Railroad's rights-of-way, such authorization to include an outline of specific conditions with which he must comply.
  6. Furnished a schedule for all work within the Railroad's rights-of-way as required by paragraph 7.B.1.
- B. The Railroad's written authorization to proceed with the work shall include the names, addresses, and telephone numbers of the Railroad's representatives who are to be notified as hereinafter required. Where more than one representative is designated, the area of responsibility of each representative shall be specified.
3. INTERFERENCE WITH RAILROAD OPERATIONS:
- A. The Contractor shall so arrange and conduct his work that there will be no interference with Railroad's operations, including train, signal, telephone and telegraphic services, or damage to the property of the Railroad or to poles, wires, and other facilities of tenants on the rights-of-way of the Railroad. Whenever work is liable to affect the operations or safety of trains, the method of doing such work shall first be submitted to the Railroad Engineer for approval, but such approval shall not relieve the Contractor from liability. Any work to be performed by the Contractor which requires flagging service or inspection service shall be deferred by the Contractor until the flagging service or inspection service required by the Railroad is available at the job site.
  - B. Whenever work within Railroad's rights-of-way is of such a nature that impediment to Railroad's operations such as use of runaround tracks or necessity for reduced speed is unavoidable, the Contractor shall schedule and conduct his operations so that such impediment is reduced to the absolute minimum.
  - C. Should conditions arising from, or in connection with the work, require that immediate and unusual provisions be made to protect operations and property of the Railroad, the Contractor shall make such provisions. If in the judgment of the Railroad Engineer, or in his absence, the Railroad's Division Engineer, such provisions is insufficient, either may require or provide such provisions as he deems necessary. In any event, such unusual provisions shall be at the Contractor's expense and without cost to the Railroad or the Sponsor.

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D. "One Call" Services do not locate buried Railroad utilities. The contractor shall contact the Railroad's representative 2 days in advance of work at those places where excavation, pile driving, or heavy loads may damage the Railroad's underground facilities. Upon request from the Contractor or Sponsor, Railroad forces will locate and paint mark or flag the Railroad's underground facilities. The Contractor shall avoid excavation or other disturbances of these facilities. If disturbance or excavation is required near a buried Railroad facility, the contractor shall coordinate with the Railroad to have the facility potholed manually with careful hand excavation. The facility shall be protected by the Contractor during the course of the disturbance under the supervision and direction of the Railroad's representative.

### 4. TRACK CLEARANCES:

- A. The minimum track clearances to be maintained by the Contractor during construction are shown on the Project Plans. If temporary clearances are not shown on the project plans, the following criteria shall govern the use of falsework and formwork above or adjacent to operated tracks.
1. A minimum vertical clearance of 22'-0" above top of highest rail shall be maintained at all times.
  2. A minimum horizontal clearance of 13'-0" from centerline of tangent track or 14'-0" from centerline of curved track shall be maintained at all times. Additional horizontal clearance may be required in special cases to be safe for operating conditions. This additional clearance will be as determined by the Railroad Engineer.
  3. All proposed temporary clearances which are less than those listed above must be submitted to Railroad Engineer for approval prior to construction and must also be authorized by the regulatory body of the State if less than the legally prescribed clearances.
  4. The temporary clearance requirements noted above shall also apply to all other physical obstructions including, but not limited to: stockpiled materials, parked equipment, placement or driving of piles, and bracing or other construction supports.
- B. Before undertaking any work within Railroad right-of-way, and before placing any obstruction over any track, the Contractor shall:
1. Notify the Railroad's representative at least 72 hours in advance of the work.



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2. Receive assurance from the Railroad's representative that arrangements have been made for flagging service as may be necessary.
3. Receive permission from the Railroad's representative to proceed with the work.
4. Ascertain that the Sponsor's Engineer has received copies of notice to the Railroad and of the Railroad's response thereto.

### 5. CONSTRUCTION PROCEDURES:

#### A. General:

1. Construction work and operations by the Contractor on Railroad property shall be:
  - a. Subject to the inspection and approval of the Railroad Engineer or their designated Construction Engineering Representative.
  - b. In accordance with the Railroad's written outline of specific conditions.
  - c. In accordance with the Railroad's general rules, regulations and requirements including those relating to safety, fall protection and personal protective equipment.
  - d. In accordance with these Special Provisions.
2. Submittal Requirements
  - a. The Contractor shall submit all construction related correspondence and submittals electronically to the Railroad Engineer.
  - b. The Contractor shall allow for 30 days for the Railroad's review and response.
  - c. All work in the vicinity of the Railroad's property that has the potential to affect the Railroad's train operations or disturb the Railroad's Property must be submitted and approved by the Railroad prior to work being performed.

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- d. All submittals and calculations must be signed and sealed by a registered engineer licensed in the state of the project work.
- e. All submittals shall first be approved by the Sponsor's Engineer and the Railroad Engineer, but such approval shall not relieve the Contractor from liability.
- f. For all construction projects, the following submittals, but not limited to those listed below, shall be provided for review and approval when applicable:
  - (1) General Means and Methods
  - (2) Ballast Protection
  - (3) Construction Excavation & Shoring
  - (4) Pipe, Culvert, & Tunnel Installations
  - (5) Demolition Procedure
  - (6) Erection & Hoisting Procedure
  - (7) Debris Shielding or Containment
  - (8) Blasting
  - (9) Formwork for the bridge deck, diaphragms, overhang brackets, and protective platforms
  - (10) Bent Cap Falsework. A lift plan will be required if the contractor wants to move the falsework over the tracks.
- g. For Undergrade Bridges (Bridges carrying the Railroad) the following submittals in addition to those listed above shall be provided for review and approval:
  - (1) Shop Drawings
  - (2) Bearing Shop Drawings and Material Certifications
  - (3) Concrete Mix Design
  - (4) Structural Steel, Rebar, and/or Strand Certifications
  - (5) 28 day Cylinder Test for Concrete Strength
  - (6) Waterproofing Material Certification
  - (7) Test Reports for Fracture Critical Members
  - (8) Foundation Construction Reports

Fabrication may not begin until the Railroad has approved the required shop drawings.
- h. The Contractor shall include in all submissions a detailed narrative indicating the progression of work with the anticipated timeframe to complete each task. Work will not be permitted to commence until the Contractor has provided

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the Railroad with a satisfactory plan that the project will be undertaken without scheduling, performance or safety related issues. Submission shall also provide a listing of the anticipated equipment to be used, the location of all equipment to be used and insure a contingency plan of action is in place should a primary piece of equipment malfunction.

### B. Ballast Protection

1. The Contractor shall submit the proposed ballast protection system detailing the specific filter fabric and anchorage system to be used during all construction activities.
2. The ballast protection is to extend 25' beyond the proposed limit of work, be installed at the start of the project and be continuously maintained to prevent all contaminants from entering the ballast section of all tracks for the entire duration of the project.

### C. Excavation:

1. The subgrade of an operated track shall be maintained with edge of berm at least 10'-0" from centerline of track and not more than 24-inches below top of rail. Contractor will not be required to make existing section meet this specification if substandard, in which case existing section will be maintained.
2. Additionally, the Railroad will require the installation of an OSHA approved handrail and orange construction safety fencing for all excavations of the Railroad right-of-way.

### D. Excavation for Structures and Shoring Protection:

1. The Contractor will be required to take special precaution and care in connection with excavating and shoring pits, and in driving piles or sheeting for footings adjacent to tracks to provide adequate lateral support for the tracks and the loads which they carry, without disturbance of track alignment and surface, and to avoid obstructing track clearances with working equipment, tools or other material.
2. All plans and calculations for shoring shall be prepared, signed, and sealed by a Registered Professional Engineer licensed in the state of the proposed project, in accordance with Norfolk Southern's Overhead Grade Separation Design Criteria, subsection H.1.6.E-

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Construction Excavation (Refer to Norfolk Southern Public Projects Manual Appendix H). The Registered Professional Engineer will be responsible for the accuracy for all controlling dimensions as well as the selection of soil design values which will accurately reflect the actual field conditions.

3. The Contractor shall provide a detailed installation and removal plan of the shoring components. Any component that will be installed via the use of a crane or any other lifting device shall be subject to the guidelines outlined in section 5.G of these provisions.
4. The Contractor shall be required to survey the track(s) and Railroad embankment and provide a cross section of the proposed excavation in relation to the tracks.
5. Calculations for the proposed shoring should include deflection calculations. The maximum deflection for excavations within 18'-0" of the centerline of the nearest track shall be 3/8". For all other cases, the max deflection shall not exceed 1/2".
6. Additionally, the Railroad will require the installation of an OSHA approved handrail and orange construction safety fencing for all excavations of the Railroad right-of-way.
7. The front face of shoring located to the closest NS track for all shoring set-ups located in Zone 2 as shown on NS Typical Drawing No. 4 – Shoring Requirements (Norfolk Southern Public Projects Manual Appendix I) shall remain in place and be cut off 2'-0" below the final ground elevation. The remaining shoring in Zone 2 and all shoring in Zone 1 may be removed and all voids must be backfilled with flowable fill.

### E. Pipe, Culvert, & Tunnel Installations

1. Pipe, Culvert, & Tunnel Installations shall be in accordance with the appropriate Norfolk Southern Design Specification as noted below:
  - a. For Open Cut Method refer to Norfolk Southern Public Projects Manual Appendix H.4.6.
  - b. For Jack and Bore Method refer to Norfolk Southern Public Projects Manual Appendix H.4.7.
  - c. For Tunneling Method refer to Norfolk Southern Public Projects Manual Appendix H.4.8.

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2. The installation methods provided are for pipes carrying storm water or open flow run-off. All other closed pipeline systems shall be installed in accordance Norfolk Southern's Pipe and Wire Program and the NSCE-8

### F. Demolition Procedures

#### 1. General

- a. Demolition plans are required for all spans over the track(s), for all spans adjacent to the track(s), if located on (or partially on) Railroad right-of-way; and in all situations where cranes will be situated on, over, or adjacent to Railroad right-of-way and within a distance of the boom length plus 15'-0" from the centerline of track.
- b. Railroad tracks and other Railroad property must be protected from damage during the procedure.
- c. A pre-demolition meeting shall be conducted with the Sponsor, the Railroad Engineer or their representative, and the key Contractor's personnel prior to the start of the demolition procedure.
- d. The Railroad Engineer or his designated representative must be present at the site during the entire demolition procedure period.
- e. Existing, obsolete, bridge piers shall be removed to a sufficient depth below grade to enable restoration of the existing/proposed track ditch, but in no case less than 2'-0" below final grade.

#### 2. Submittal Requirements

- a. In addition to the submittal requirements outlined in Section 5.A.2 of these provisions, the Contractor shall submit the following for approval by the Railroad Engineer:
  - (1) A plan showing the location of cranes, horizontally and vertically, operating radii, with delivery or disposal locations shown. The location of all tracks and other Railroad facilities as well as all obstructions such as wire lines, poles, adjacent structures, etc. must also be shown.

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- (2) Rating sheets showing cranes or lifting devices to be adequate for 150% of the actual weight of the pick, including all rigging components. A complete set of crane charts, including crane, counterweight, and boom nomenclature is to be submitted. Safety factors that may have been “built-in” to the crane charts are not to be considered when determining the 150% factor of safety.
- (3) Plans and computations showing the weight of the pick must be submitted. Calculations shall be made from plans of the existing structure showing complete and sufficient details with supporting data for the demolition the structure. If plans do not exist, lifting weights must be calculated from field measurements. The field measurements are to be made under the supervision of the Registered Professional Engineer submitting the procedure and calculations.
- (4) The Contractor shall provide a sketch of all rigging components from the crane’s hook block to the beam. Catalog cuts or information sheets of all rigging components with their lifting capacities shall be provided. All rigging must be adequate for 150% of the actual weight of the pick. Safety factors that may have been “built-in” to the rating charts are not to be considered when determining the 150% factor of safety. All rigging components shall be clearly identified and tagged with their rated lifting capacities. The position of the rigging in the field shall not differ from what is shown on the final plan without prior review from the Sponsor and the Railroad.
- (5) A complete demolition procedure, including the order of lifts, time required for each lift, and any repositioning or re-hitching of the crane or cranes.
- (6) Design and supporting calculations for the temporary support of components, including but not limited to the stability of the superstructure during the temporary condition, temporary girder tie-downs and falsework.

### 3. Overhead Demolition Debris Shield

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- a. The demolition debris shield shall be installed prior to the demolition of the bridge deck or other relevant portions of the superstructure over the track area to catch all falling debris.
- b. The demolition debris shield shall provide a minimum vertical clearance as specified in Section 4.A.1 of these provisions or maintain the existing vertical clearance if the existing clearance is less than that specified in Section 4.A.1.
- c. The Contractor shall include the demolition debris shield installation/removal means and methods as part of the proposed Demolition procedure submission.
- d. The Contractor shall submit the demolition debris shield design and supporting calculations for approval by the Railroad Engineer.
- e. The demolition debris shield shall have a minimum design load of 50 pounds per square foot plus the weight of the equipment, debris, personnel, and other loads to be carried.
- f. The Contractor shall include the proposed bridge deck removal procedure in its demolition means and methods and shall verify that the size and quantity of the demolition debris generated by the procedure does not exceed the shield design loads.
- g. The Contractor shall clean the demolition debris shield daily or more frequently as dictated either by the approved design parameters or as directed by the Railroad Engineer.

### 4. Vertical Demolition Debris Shield

- a. A vertical demolition debris shield may be required for substructure removals in close proximity to the Railroad's track and other facilities, as determined by the Railroad Engineer.

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### G. Erection & Hoisting Procedures

#### 1. General

- a. Erection plans are required for all spans over the track(s), for all spans adjacent to the track(s), if located on (or partially on) Railroad right-of-way; and in all situations where cranes will be situated on, over, or adjacent to Railroad right-of-way and within a distance of the boom length plus 15'-0" from the centerline of track.
- b. Railroad tracks and other Railroad property must be protected from damage during the erection procedure.
- c. A pre-erection meeting shall be conducted with the Sponsor, the Railroad Engineer or their representative, and the key Contractor's personnel prior to the start of the erection procedure.
- d. The Railroad Engineer or his designated representative must be present at the site during the entire erection procedure period.
- e. For field splices located over Railroad property, a minimum of 50% of the holes for each connection shall be filled with bolts or pins prior to releasing the crane. A minimum of 50% of the holes filled shall be filled with bolts. All bolts must be appropriately tightened. Any changes to previously approved field splice locations must be submitted to the Railroad for review and approval. Refer to Norfolk Southern's Overhead Grade Separation Design Criteria for additional splice details (Norfolk Southern Public Projects Manual Appendix H.1, Section 4.A.3.).

#### 2. Submittal Requirements

- a. In addition the submittal requirements outlined in Section 5.A.2 of these provisions, the Contractor shall submit the following for approval by the Railroad Engineer:

(1) As-built beam seat elevations - All as-built bridge seats and top of rail elevations shall be furnished to



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the Railroad Engineer for review and verification at least 30 days in advance of the erection, to ensure that minimum vertical clearances as approved in the plans will be achieved.

- (2) A plan showing the location of cranes, horizontally and vertically, operating radii, with delivery or staging locations shown. The location of all tracks and other Railroad facilities as well as all obstructions such as wire lines, poles, adjacent structures, etc. must also be shown.
- (3) Rating sheets showing cranes or lifting devices to be adequate for 150% of the actual weight of the pick, including all rigging components. A complete set of crane charts, including crane, counterweight, and boom nomenclature is to be submitted. Safety factors that may have been "built-in" to the crane charts are not to be considered when determining the 150% factor of safety.
- (4) Plans and computations showing the weight of the pick must be submitted. Calculations shall be made from plans of the proposed structure showing complete and sufficient details with supporting data for the erection of the structure. If plans do not exist, lifting weights must be calculated from field measurements. The field measurements are to be made under the supervision of the Registered Professional Engineer submitting the procedure and calculations.
- (5) The Contractor shall provide a sketch of all rigging components from the crane's hook block to the beam. Catalog cuts or information sheets of all rigging components with their lifting capacities shall be provided. All rigging must be adequate for 150% of the actual weight of the pick. Safety factors that may have been "built-in" to the rating charts are not to be considered when determining the 150% factor of safety. All rigging components shall be clearly identified and tagged with their rated lifting capacities. The position of the rigging in the field shall not differ from what is shown on the final plan without prior review from the Sponsor and the Railroad.

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- (6) A complete erection procedure, including the order of lifts, time required for each lift, and any repositioning or re-hitching of the crane or cranes.
- (7) Design and supporting calculations for the temporary support of components, including but not limited to temporary girder tie-downs and falsework.

### H. Blasting:

1. The Contractor shall obtain advance approval of the Railroad Engineer and the Sponsor Engineer for use of explosives on or adjacent to Railroad property. The request for permission to use explosives shall include a detailed blasting plan. If permission for use of explosives is granted, the Contractor will be required to comply with the following:
  - a. Blasting shall be done with light charges under the direct supervision of a responsible officer or employee of the Contractor and a licensed blaster.
  - b. Electric detonating fuses shall not be used because of the possibility of premature explosions resulting from operation of two-way radios.
  - c. No blasting shall be done without the presence of the Railroad Engineer or his authorized representative. At least 72 hours advance notice to the person designated in the Railroad's notice of authorization to proceed (see paragraph 2.B) will be required to arrange for the presence of an authorized Railroad representative and such flagging as the Railroad may require.
  - d. Have at the job site adequate equipment, labor and materials and allow sufficient time to clean up debris resulting from the blasting without delay to trains, as well as correcting at his expense any track misalignment or other damage to Railroad property resulting from the blasting as directed by the Railway's authorized representative. If his actions result in delay of trains, the Contractor shall bear the entire cost thereof.
  - e. The blasting Contractor shall have a copy of the approved blasting plan on hand while on the site.

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- f. Explosive materials or loaded holes shall not be left unattended at the blast site.
  - g. A seismograph shall be placed on the track shoulder adjacent to each blast which will govern the peak particle velocity of two inches per second. Measurement shall also be taken on the ground adjacent to structures as designated by a qualified and independent blasting consultant. The Railroad reserves the option to direct the placement of additional seismographs at structures or other locations of concern, without regard to scaled distance.
  - h. After each blast, the blasting Contractor shall provide a copy of their drill log and blast report, which includes number of holes, depth of holes, number of decks, type and pounds of explosives used per deck.
  - i. The Railroad may require top of rail elevations and track centers taken before, during and after the blasting and excavation operation to check for any track misalignment resulting from the Contractor's activities.
2. The Railroad representative will:
- a. Determine approximate location of trains and advise the Contractor the appropriate amount of time available for the blasting operation and clean up.
  - b. Have the authority to order discontinuance of blasting if, in his opinion, blasting is too hazardous or is not in accord with these special provisions.
3. The Contractor must hire, at no expense to the Railroad, a qualified and independent blasting consultant to oversee the use of explosives. The blasting consultant will:
- a. Review the Contractor's proposed drilling and loading patterns, and with the blasting consultant's personnel and instruments, monitor the blasting operations.
  - b. Confirm that the minimum amounts of explosives are used to remove the rock.

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- c. Be empowered to intercede if he concludes that the Contractor's blasting operations are endangering the Railway.
  - d. Submit a letter acknowledging that he has been engaged to oversee the entire blasting operation and that he approves of the blasting plan.
  - e. Furnish copies of all vibration readings to the Railroad representative immediately after each blast. The representative will sign and date the seismograph tapes after each shot to verify the readings are for that specific shot.
  - f. Advise the Railroad representative as to the safety of the operation and notify him of any modifications to the blasting operation as the work progresses.
4. The request for permission to use explosives on the Railroad's Right-of-Way shall include a blasting proposal providing the following details:
- a. A drawing which shows the proposed blasting area, location of nearest hole and distance to Railway structures, all with reference to the centerline of track.
  - b. Hole diameter.
  - c. Hole spacing and pattern.
  - d. Maximum depth of hole.
  - e. Maximum number of decks per hole.
  - f. Maximum pounds of explosives per hole.
  - g. Maximum pounds of explosives per delay.
  - h. Maximum number of holes per detonation.
  - i. Type of detonator and explosives to be used. (Electronic detonating devices will not be permitted). Diameter of explosives if different from hole diameter.
  - j. Approximate dates and time of day when the explosives are to be detonated.

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- k. Type of flyrock protection.
  - l. Type and patterns of audible warning and all clear signals to be used before and after each blast.
  - m. A copy of the blasting license and qualifications of the person directly in charge of the blasting operation, including their name, address and telephone number.
  - n. A copy of the Authority's permit granting permission to blast on the site.
  - o. A letter from the blasting consultant acknowledging that he has been engaged to oversee the entire blasting operation and that he approves of the blasting plan.
  - p. In addition to the insurance requirements outlined in Paragraph 14 of these Provisions, A certificate of insurance from the Contractor's insurer stating the amount of coverage for XCU (Explosive Collapse and Underground Hazard) insurance and that XCU Insurance is in force for this project.
  - q. A copy of the borings and Geotechnical information or report.
- I. Track Monitoring
- 1. At the direction of the Railroad Engineer, any activity that has the potential to disturb the Railroad track structure may require the Contractor to submit a detailed track monitoring program for approval by the Railroad Engineer.
  - 2. The program shall specify the survey locations, the distance between the location points, and frequency of monitoring before, during, and after construction. Railroad reserves the right to modify the survey locations and monitoring frequency as necessary during the project.
  - 3. The survey data shall be collected in accordance with the approved frequency and immediately furnished to the Railroad Engineer for analysis.
  - 4. If any movement has occurred as determined by the Railroad Engineer, the Railroad will be immediately notified. Railroad, at its sole discretion, shall have the right to immediately require all Contractor operations to be ceased and determine what corrective

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action is required. Any corrective action required by the Railroad or performed by the Railroad including the monitoring of corrective action of the Contractor will be at project expense.

### J. Maintenance of Railroad Facilities:

1. The Contractor will be required to maintain all ditches and drainage structures free of silt or other obstructions which may result from his operations and provide and maintain any erosion control measures as required. The Contractor will promptly repair eroded areas within Railroad rights-of-way and repair any other damage to the property of the Railroad or its tenants.
2. If, in the course of construction, it may be necessary to block a ditch, pipe or other drainage facility, temporary pipes, ditches or other drainage facilities shall be installed to maintain adequate drainage, as approved by the Railroad Engineer. Upon completion of the work, the temporary facilities shall be removed and the permanent facilities restored.
3. All such maintenance and repair of damages due to the Contractor's operations shall be done at the Contractor's expense.

### K. Storage of Materials and Equipment:

1. Materials and equipment shall not be stored where they will interfere with Railroad operations, nor on the rights-of-way of the Railroad without first having obtained permission from the Railroad Engineer, and such permission will be with the understanding that the Railroad will not be liable for damage to such material and equipment from any cause and that the Railroad Engineer may move or require the Contractor to move, at the Contractor's expense, such material and equipment.
2. All grading or construction machinery that is left parked near the track unattended by a watchman shall be effectively immobilized so that it cannot be moved by unauthorized persons. The Contractor shall protect, defend, indemnify and save Railroad, and any associated, controlled or affiliated corporation, harmless from and against all losses, costs, expenses, claim or liability for loss or damage to property or the loss of life or personal injury, arising out of or incident to the Contractor's failure to immobilize grading or construction machinery.
3. Contractor shall remove from Railroad property all soil, fill, debris, or other materials (whether solid or liquid) generated as a result of

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or associated with the Project Work that are contaminated and/or potentially contaminated, and shall properly handle, store, sample, transport, and dispose of such material in accordance with all applicable federal state, or local environmental laws, regulations, rules, standards and permits. Contractor shall protect, defend, indemnify and save Railroad, and any associated, controlled or affiliated corporation, harmless from and against all losses, costs, expenses, claim or liability for loss or damage to property or the loss of life or personal injury, arising out of or incident to the Contractor's failure to perform such handling, sampling, transporting, and disposal in accordance with applicable laws, rules, and regulations.

### L. Cleanup:

1. Upon completion of the work, the Contractor shall remove from within the limits of the Railroad rights-of-way, all machinery, equipment, surplus materials, falsework, rubbish or temporary buildings of the Contractor, and leave said rights-of-way in a neat condition satisfactory to the Railroad Engineer or his authorized representative.

### 6. DAMAGES:

- A. The Contractor shall assume all liability for any and all damages to his work, employees, servants, equipment and materials caused by Railroad traffic.
- B. Any cost incurred by the Railroad for repairing damages to its property or to property of its tenants, caused by or resulting from the operations of the Contractor, shall be paid directly to the Railroad by the Contractor.

### 7. FLAGGING SERVICES:

#### A. Requirements:

1. Flagging services will not be provided until the Contractor's insurance has been reviewed & approved by the Railroad.
2. Under the terms of the agreement between the Sponsor and the Railroad, the Railroad has sole authority to determine the need for flagging required to protect its operations. In general, the requirements of such services will be whenever the Contractor's personnel or equipment are or are likely to be, working on the Railroad's right-of-way, or across, over, adjacent to, or under a track, or when such work has disturbed or is likely to disturb

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a Railroad structure or the Railroad roadbed or surface and alignment of any track to such extent that the movement of trains must be controlled by flagging.

3. Normally, the Railroad will assign one flagman to a project; but in some cases, more than one may be necessary, such as yard limits where three (3) flagmen may be required. However, if the Contractor works within distances that violate instructions given by the Railroad's authorized representative or performs work that has not been scheduled with the Railroad's authorized representative, a flagman or flagmen may be required full time until the project has been completed.
4. For Projects exceeding 30 days of construction, Contractor shall provide the flagmen a small work area with a desk/counter and chair within the field/site trailer, including the use of bathroom facilities, where the flagman can check in/out with the Project, as well as to the flagman's home terminal. The work area should provide access to two (2) electrical outlets for recharging radio(s), and a laptop computer; and have the ability to print off needed documentation and orders as needed at the field/site trailer. This should aid in maximizing the flagman's time and efficiency on the Project.

### B. Scheduling and Notification:

1. The Contractor's work requiring Railroad flagging should be scheduled to limit the presence of a flagman at the site to a maximum of 50 hours per week. The Contractor shall receive Railroad approval of work schedules requiring a flagman's presence in excess of 40 hours per week.
2. Not later than the time that approval is initially requested to begin work on Railroad right-of-way, Contractor shall furnish to the Railroad and the Sponsor a schedule for all work required to complete the portion of the project within Railroad right-of-way and arrange for a job site meeting between the Contractor, the Sponsor, and the Railroad's authorized representative. Flagman or Flagmen may not be provided until the job site meeting has been conducted and the Contractor's work scheduled.
3. The Contractor will be required to give the Railroad representative at least 10 working days of advance written notice of intent to begin work within Railroad right-of-way in accordance with this special provision. Once begun, when such work is then



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suspended at any time, or for any reason, the Contractor will be required to give the Railroad representative at least 3 working days of advance notice before resuming work on Railroad right-of-way. Such notices shall include sufficient details of the proposed work to enable the Railroad representative to determine if flagging will be required. If such notice is in writing, the Contractor shall furnish the Engineer a copy; if notice is given verbally, it shall be confirmed in writing with copy to the Engineer. If flagging is required, no work shall be undertaken until the flagman, or flagmen are present at the job site. It may take up to 30 days to obtain flagging initially from the Railroad. When flagging begins, the flagman is usually assigned by the Railroad to work at the project site on a continual basis until no longer needed and cannot be called for on a spot basis. If flagging becomes unnecessary and is suspended, it may take up to 30 days to again obtain from the Railroad. Due to Railroad labor agreements, it is necessary to give 5 working days notice before flagging service may be discontinued and responsibility for payment stopped.

4. If, after the flagman is assigned to the project site, an emergency arises that requires the flagman's presence elsewhere, then the Contractor shall delay work on Railroad right-of-way until such time as the flagman is again available. Any additional costs resulting from such delay shall be borne by the Contractor and not the Sponsor or Railroad.

### C. Payment:

1. The Sponsor will be responsible for paying the Railroad directly for any and all costs of flagging which may be required to accomplish the construction.
2. The estimated cost of flagging is the current rate per day based on a 10-hour work day. This cost includes the base pay for the flagman, overhead, and includes a per diem charge for travel expenses, meals and lodging. The charge to the Sponsor by the Railroad will be the actual cost based on the rate of pay for the Railroad's employees who are available for flagging service at the time the service is required.
3. Work by a flagman in excess of 8 hours per day or 40 hours per week, but not more than 12 hours a day will result in overtime pay at 1 and 1/2 times the appropriate rate. Work by a flagman in excess of 12 hours per day will result in overtime at 2 times the

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appropriate rate. If work is performed on a holiday, the flagging rate is 2 and 1/2 times the normal rate.

4. Railroad work involved in preparing and handling bills will also be charged to the Sponsor. Charges to the Sponsor by the Railroad shall be in accordance with applicable provisions of Subchapter B, Part 140, Subpart I and Subchapter G, Part 646, Subpart B of the Federal-Aid Policy Guide issued by the Federal Highway Administration on December 9, 1991, including all current amendments. Flagging costs are subject to change. The above estimates of flagging costs are provided for information only and are not binding in any way.

### D. Verification:

1. Railroad's flagman will electronically enter flagging time via Railroad's electronic billing system. Any complaints concerning flagging must be resolved in a timely manner. If the need for flagging is questioned, please contact the Railroad Engineer. All verbal complaints will be confirmed in writing by the Contractor within 5 working days with a copy to the Sponsor's Engineer. Address all written correspondence electronically to Railroad Engineer.
2. The Railroad flagman assigned to the project will be responsible for notifying the Sponsor Engineer upon arrival at the job site on the first day (or as soon thereafter as possible) that flagging services begin and on the last day that he performs such services for each separate period that services are provided. The Sponsor's Engineer will document such notification in the project records. When requested, the Sponsor's Engineer will also sign the flagman's diary showing daily time spent and activity at the project site.

### 8. HAUL ACROSS RAILROAD TRACK:

- A. Where the plans show or imply that materials of any nature must be hauled across Railroad's track, unless the plans clearly show that the Sponsor has included arrangements for such haul in its agreement with the Railroad, the Contractor will be required to make all necessary arrangements with the Railroad regarding means of transporting such materials across the Railroad's track. The Contractor or Sponsor will be required to bear all costs incidental to such crossings whether services are performed by his own forces or by Railroad personnel.

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- B. No crossing may be established for use of the Contractor for transporting materials or equipment across the tracks of the Railroad unless specific authority for its installation, maintenance, necessary watching and flagging thereof and removal, until a temporary private crossing agreement has been executed between the Contractor and Railroad. The approval process for an agreement normally takes 90 days.

### 9. WORK FOR THE BENEFIT OF THE CONTRACTOR:

- A. All temporary or permanent changes in wire lines or other facilities which are considered necessary to the project are shown on the plans; included in the force account agreement between the Sponsor and the Railroad or will be covered by appropriate revisions to same which will be initiated and approved by the Sponsor and/or the Railroad.
- B. Should the Contractor desire any changes in addition to the above, then he shall make separate arrangements with the Railroad for same to be accomplished at the Contractor's expense.

### 10. COOPERATION AND DELAYS:

- A. It shall be the Contractor's responsibility to arrange a schedule with the Railroad for accomplishing stage construction involving work by the Railroad or tenants of the Railroad. In arranging his schedule he shall ascertain, from the Railroad, the lead time required for assembling crews and materials and shall make due allowance therefore.
- B. No charge or claim of the Contractor against either the Sponsor or the Railroad will be allowed for hindrance or delay on account of railroad traffic; any work done by the Railroad or other delay incident to or necessary for safe maintenance of railroad traffic or for any delays due to compliance with these special provisions.

### 11. TRAINMAN'S WALKWAYS:

- A. Along the outer side of each exterior track of multiple operated track, and on each side of single operated track, an unobstructed continuous space suitable for trainman's use in walking along trains, extending to a line not less than 10 feet from centerline of track, shall be maintained. Any temporary impediments to walkways and track drainage encroachments or obstructions allowed during work hours while Railroad's protective service is provided shall be removed before the close of each work day. If there is any excavation near the walkway, a handrail, with 10'-0" minimum clearance from centerline of track, shall be placed and must conform to AREMA and/or FRA standards.

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### 12. GUIDELINES FOR PERSONNEL ON RAILROAD RIGHT-OF-WAY:

- A. The Contractor's personnel authorized to perform work on Railroad's property as specified in Section 2 above are required to complete Norfolk Southern Roadway Worker Protection Training and complete the E-Railsafe certification; The Contractor and the Sponsor's personnel must be familiar with Norfolk Southern's standard operating rules and guidelines, should conduct themselves accordingly, and may be removed from the property for failure to follow these guidelines.
- B. All persons shall wear hard hats. Appropriate eye and hearing protection must be used. Working in shorts is prohibited. Shirts must cover shoulders, back and abdomen. Working in tennis or jogging shoes, sandals, boots with high heels, cowboy and other slip-on type boots is prohibited. Hard-sole, lace-up footwear, zippered boots or boots cinched up with straps which fit snugly about the ankle are adequate. Wearing of safety boots is strongly recommended. In the vicinity of at-grade crossings, it is strongly recommended that reflective vests be worn.
- C. No one is allowed within 25' of the centerline of track without specific authorization from the flagman.
- D. All persons working near track while train is passing are to lookout for dragging bands, chains and protruding or shifted cargo.
- E. No one is allowed to cross tracks without specific authorization from the flagman.
- F. All welders and cutting torches working within 25' of track must stop when train is passing.
- G. No steel tape or chain will be allowed to cross or touch rails without permission from the Railroad.

### 13. GUIDELINES FOR EQUIPMENT ON RAILROAD RIGHT-OF-WAY:

- A. No crane or boom equipment will be allowed to set up to work or park within boom distance plus 15' of centerline of track without specific permission from Railroad official and flagman.
- B. No crane or boom equipment will be allowed to foul track or lift a load over the track without flag protection and track time.

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- C. All employees will stay with their machines when crane or boom equipment is pointed toward track.
- D. All cranes and boom equipment under load will stop work while train is passing (including pile driving).
- E. Swinging loads must be secured to prevent movement while train is passing.
- F. No loads will be suspended above a moving train.
- G. No equipment will be allowed within 25' of centerline of track without specific authorization of the flagman.
- H. Trucks, tractors or any equipment will not touch ballast line without specific permission from Railroad official and flagman. Orange construction fencing may be required as directed.
- I. No equipment or load movement within 25' or above a standing train or Railroad equipment without specific authorization of the flagman.
- J. All operating equipment within 25' of track must halt operations when a train is passing. All other operating equipment may be halted by the flagman if the flagman views the operation to be dangerous to the passing train.
- K. All equipment, loads and cables are prohibited from touching rails.
- L. While clearing and grubbing, no vegetation will be removed from Railroad embankment with heavy equipment without specific permission from the Railroad Engineer and flagman.
- M. No equipment or materials will be parked or stored on Railroad's property unless specific authorization is granted from the Railroad Engineer.
- N. All unattended equipment that is left parked on Railroad property shall be effectively immobilized so that it cannot be moved by unauthorized persons.
- O. All cranes and boom equipment will be turned away from track after each work day or whenever unattended by an operator.
- P. Prior to performing any crane operations, the Contractor shall establish a single point of contact for the Railroad flagman to remain in communication with at all times. Person must also be in direct contact with the individual(s) directing the crane operation(s).

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### 14. INSURANCE:

A. In addition to any other forms of insurance or bonds required under the terms of the contract and specifications, the Prime Contractor will be required to carry insurance of the following kinds and amounts:

1. a. Commercial General Liability Insurance having a combined single limit of not less than \$2,000,000 per occurrence for all loss, damage, cost and expense, including attorneys' fees, arising out of bodily injury liability and property damage liability during the policy period. Said policy shall include explosion, collapse, and underground hazard (XCU) coverage, shall be endorsed to name Railroad specified in item A.2.c. below both as the certificate holder and as an additional insured, and shall include a severability of interests provision.  
  
b. Automobile Liability Insurance with a combined single limit of not less than \$1,000,000 each occurrence for injury to or death of persons and damage to or loss or destruction of property. Said policy or policies shall be endorsed to name Railroad specified in item A.2.c. below both as the certificate holder and as an additional insured and shall include a severability of interests provision.
2. Railroad Protective Liability Insurance having a combined single limit of not less than \$2,000,000 each occurrence and \$6,000,000 in the aggregate applying separately to each annual period. If the project involves track over which passenger trains operate, the insurance limits required are not less than a combined single limit of \$5,000,000 each occurrence and \$10,000,000 in the aggregate applying separately to each annual period. Said policy shall provide coverage for all loss, damage or expense arising from bodily injury and property damage liability, and physical damage to property attributed to acts or omissions at the job site.

The standards for the Railroad Protective Liability Insurance are as follows:

- a. The insurer must be rated A- or better by A.M. Best Company, Inc.

**NOTE: NS does not accept from insurers Chartis (AIG or Affiliated Company including Lexington Insurance Company), Hudson Group or Liberty or Affiliated Company, American Contractors Insurance Company and Erie Insurance Company including Erie Insurance Exchange and Erie Indemnity Company.**

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- b. The policy must be written using one of the following combinations of Insurance Services Office (“ISO”) Railroad Protective Liability Insurance Form Numbers:
- (1) CG 00 35 01 96 and CG 28 31 10 93; or
  - (2) CG 00 35 07 98 and CG 28 31 07 98; or
  - (3) CG 00 35 10 01; or
  - (4) CG 00 35 12 04; or
  - (5) CG 00 35 12 07; or
  - (6) CG 00 35 04 13.

- c. The named insured shall read:

Norfolk Southern Corporation and its subsidiaries  
Three Commercial Place  
Norfolk, Virginia 23510-2191  
Attn: Risk Manager

**(NOTE: Railroad does not share coverage on RRPL with any other entity on his policy)**

- d. The description of operations must appear on the Declarations, must match the project description in this agreement, and must include the appropriate Sponsor project and contract identification numbers.
- e. The job location must appear on the Declarations and must include the city, state, and appropriate highway name/number. **NOTE: Do not include any references to milepost, valuation station, or mile marker on the insurance policy.**
- f. The name and address of the prime Contractor must appear on the Declarations.
- g. The name and address of the Sponsor must be identified on the Declarations as the “Involved Governmental Authority or Other Contracting Party.”
- h. Endorsements/forms that are **required**:
- (1) Physical Damage to Property Amendment
  - (2) Terrorism Risk Insurance Act (TRIA) coverage must be included
- i. Other endorsements/forms that will be accepted are:

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- (1) Broad Form Nuclear Exclusion – Form IL 00 21
- (2) 30-day Advance Notice of Non-renewal or cancellation
- (3) Required State Cancellation Endorsement
- (4) Quick Reference or Index Form CL/IL 240

- j. Endorsements/forms that are NOT acceptable are:
- (1) Any Pollution Exclusion Endorsement except CG 28 31
  - (2) Any Punitive or Exemplary Damages Exclusion
  - (3) Known injury or Damage Exclusion form CG 00 59
  - (4) Any Common Policy Conditions form
  - (5) An Endorsement that limits or excludes Professional Liability coverage
  - (6) A Non-Cumulation of Liability or Pyramiding of Limits Endorsement
  - (7) An Endorsement that excludes TRIA coverage
  - (8) A Sole Agent Endorsement
  - (9) Any type of deductible endorsement or amendment
  - (10) Any other endorsement/form not specifically authorized in item no. 2.h above.

B. If any part of the work is sublet, similar insurance, and evidence thereof as specified in A.1 above, shall be provided by or on behalf of the subcontractor to cover its operations on Railroad's right of way.

C. All insurance required under the preceding subsection A shall be underwritten by insurers and be of such form and content, as may be acceptable to the Company. Prior to entry on Railroad right-of-way, the original Railroad Protective Liability Insurance Policy shall be submitted by the Prime Contractor to the Department at the address below for its review and transmittal to the Railroad. In addition, certificates of insurance evidencing the Prime Contractor's and any subcontractors' Commercial General Liability Insurance shall be issued to the Railroad and the Department at the addresses below, and forwarded to the Department for its review and transmittal to the Railroad. The certificates of insurance shall state that the insurance coverage will not be suspended, voided, canceled, or reduced in coverage or limits without (30) days advance written notice to Railroad and the Department. No work will be permitted by Railroad on its right-of-way until it has reviewed and approved the evidence of insurance required herein.

**SPONSOR:**

NCDOT Rail Division  
 ATTN: State Railroad Agent  
 1556 Mail Service Center  
 Raleigh, NC 27699-1556

**RAILROAD:**

Risk Management  
 Norfolk Southern Railway Company  
 Three Commercial Place  
 Norfolk, Virginia 23510-2191



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D. The insurance required herein shall in no way serve to limit the liability of Sponsor or its Contractors under the terms of this agreement.

E. Insurance Submission Procedures

1. Railroad will only accept initial insurance submissions via US Mail or Overnight carrier to the address noted in C above. Railroad will NOT accept initial insurance submissions via email or faxes.

**Please provide point of contact information with the submission including a phone number and email address.**

**NOTE: Only one (1) set of the original or certified true copy of the Railroad Protective Policy as required under section 14 (2) and the contractor's certificate of liability insurance as required for section 14(1) (a) and 14 (1) (b) as part of the project should be provided to NS.**

2. Railroad requires the following two (2) forms of insurance in the initial insurance submission to be submitted under a cover letter providing details of the project and contact information:
  - a. The full original or certified true countersigned copy of the railroad protective liability insurance policy in its entirety inclusive of all declarations, schedule of forms and endorsements along with the policy forms and endorsements.
  - b. The Contractor's commercial general, automobile, and workers' compensation liability insurance certificate of liability insurance evidencing a combined single limit of a minimum of \$2M per occurrence of general and \$1M per occurrence of automobile liability insurance naming Norfolk Southern Railway Company, Three Commercial Place, Norfolk, VA 23510 as the certificate holder and as an additional insured on both the general and automobile liability insurance policy.
3. It should be noted that the Railroad does not accept notation of Railroad Protective insurance on a certificate of liability insurance form or Binders as Railroad must have the full original countersigned policy. Further, please note that mere receipt of the policy is not the only issue but review for compliance. Due to the number of projects system-wide, it typically takes a minimum of 30-45 days for the Railroad to review.

### 15. FAILURE TO COMPLY:

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- A. In the event the Contractor violates or fails to comply with any of the requirements of these Special Provisions:
1. The Railroad Engineer may require that the Contractor vacate Railroad property.
  2. The Sponsor's Engineer may withhold all monies due the Contractor on monthly statements.
- B. Any such orders shall remain in effect until the Contractor has remedied the situation to the satisfaction of the Railroad Engineer and the Sponsor's Engineer.

**16. PAYMENT FOR COST OF COMPLIANCE:**

- A. No separate payment will be made for any extra cost incurred on account of compliance with these special provisions. All such costs shall be included in prices bid for other items of the work as specified in the payment items.

**17. PROJECT INFORMATION**

- A. Date: April 9, 2018
- B. NS File No.: LLS00331499
- C. NS Milepost: 377.4 – 378.1
- D. Sponsor's Project No.: C204158 P-5705BA, P-5705BB

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### **INCORPORATION OF AND REVISIONS TO APPENDIX A, NORFOLK SOUTHERN STANDARD SPECIAL PROVISIONS FOR PROTECTION OF RAILWAY INTERESTS:**

The Norfolk Southern – Standard Special Provisions for Protection of Railway Interests are incorporated into this document and can be found in Appendix A. The provisions in this proposal document shall govern.

Make the following changes wherever applicable to Appendix A, Norfolk Southern Standard Special Provisions for Protection of Railway Interests:

Replace all references to the “Project Sponsor” and/or “Sponsor” with the “Department.”

The last sentence of the final paragraph in Section 1 of Appendix A which reads: “These terms and conditions are subject to change without notice, from time to time in the sole discretion of the Railroad. Contractor must request from Railroad and follow the latest version of these provisions prior to commencing work.” shall not apply to this proposal.

All directives from the Railroad Engineer shall require approval from the Engineer. Nothing in the Norfolk Southern Standard Special Provisions for Protection of Railway Interests shall override the Authority of the Engineer, see Section 105-1 of the *Standard Specifications*.

All correspondence, communication, and/or submittals to be sent to the Railroad shall first be sent to the Engineer. The Engineer will then notify the contractor as to whether NCDOT Rail Division will forward the information to Norfolk Southern or whether the contractor shall send to Norfolk Southern.

On this contract, in the interest of safety, all requirements for beginning or performing work in the railroad rights-of-way as identified in Appendix A, shall be deemed to apply to all work within 25 feet of the centerline of an active railroad track or the proposed tracks, all costs and schedule impacts including but not limited to: generation of right of way entry permit; review and comment resolution; compliance and updates to the right of way entry permit based on field conditions will be incidental to the Mobilization Bid item of the contract.

Where a cost is indicated to be “Project Cost” it shall be assigned between the Contractor and the Department in accordance with the terms of the contract.

Where Roadway Worker Protection Training courses are required add that this course shall be taken annually through an NSR-approved vendor by all contractor or sub-contractor personnel working on NSR Right of Way or adjacent to NSR operated tracks.

Additional information about E-Railsafe certification requirements and responsibilities can be found at: <http://www.e-railsafe.com/> .

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If NSR changes vendors for E-Railsafe certification, the Contractor will be required to obtain similar certification through the replacement vendor at or prior to the end of the Contractor's current certification period.

At the end of Section 5, Part D, Paragraph 2, add the following:

The procedure for doing such work, including need of and plans for shoring, shall first be reviewed by the Engineer then reviewed and approved by the Railroad Engineer, but such approval shall not relieve the Contractor from liability.

At the end of Section 7, Part C, Paragraph 1, add the following:

Any additional cost for additional flagging as a result of work that is determined to be for the benefit of the Contractor will be the contractor's responsibility and shall be deducted from the Contractor's monies.

At the end of Section 9, Part B, add the following:

The Contractor shall notify the Department of agreements between the Railroad and the Contractor for any work for the benefit of the Contractor.

At the end of Section 10, Part A, add the following:

The Contractor shall cooperate with others in the construction of the project to the end that all work may be accomplished to the best advantage.

The Contractor shall insure that all work required to be completed by his forces prior to Railroad's crews schedule move in date is completed. Delays by the Contractor in meeting the schedule can result in delays in rescheduling Railroad crews and result in delays to the project. The Contractor shall have no claims whatsoever against the Railroad or the Department for delays as a result of rescheduling Railroad crews due the Contractor failing to meet his schedule.

Under Section 12 Guidelines for Personnel on Railroad Right-of-Way, add the following:

The Contractor and all personnel must follow all applicable railroad and governmental rules, with particular attention paid to Railroad operating rules, Railroad rules for the conduct of Contractors, Railroad rules for the operation of moving vehicles, and Federal Railway Administration roadway worker rules.

The Contractor shall hold daily safety briefings involving all personnel working on site per railroad safety rules. Personnel arriving onsite after the

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safety briefing shall be briefed before proceeding with their work. The Contractor and all personnel shall hold additional safety briefings during the day as conditions or work changes.

Anyone working on Railroad Right-of-Way found to be under the influence of alcohol or other intoxicant, narcotic or hallucinogenic drugs, or in possession of such intoxicant or drugs, shall be dismissed from the property by the Contractor and not allowed to return.

The Contractor must promptly notify the Engineer and the Railroad Engineer of any safety incident or injury involving any person(s) on the project site.

When anyone working on Railroad Right-of-Way is injured, the Contractor shall arrange for emergency medical assistance, if needed, and the Contractor shall notify the Engineer and the Railroad Engineer of such incident by the quickest method of communication available. At the direction of the Engineer and Railroad Engineer, the Contractor shall work with local emergency response personnel to develop action plans to respond to emergency situations.

The Contractor is responsible for maintaining emergency site access(es) for local emergency response personnel.

Under Section 13 Guidelines for Equipment on Railroad Right-of-Way add the following:

The Contractor's actions shall not interfere with normal train operations. The Contractor shall provide a weekly schedule of activities that may affect train operations or require flagging protection.

NSR will provide service outages only when absolutely required for construction activities as determined by the Railroad Engineer. No claim by the Contractor against NSR and the Department will be allowed for delays caused by NSR's operations.

At locations where a flagman is deemed necessary by the Railroad Engineer for the safety of Railroad's property and operations, the Contractor will observe the directions given by the RWIC/flagman. The Contractor will assure that its officers, agents, suppliers, subcontractors and employees observe the directives given by the RWIC/flagman. It is distinctly understood, however, that no direction or failure to give direction by the RWIC/flagman will relieve the Contractor from any of its indemnification commitments in the contract.

Railroad regulations concerning the movement of vehicles on Railroad property shall be followed by the Contractor, its subcontractors and all respective personnel.

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Use of access routes shall not cause the fouling of turnouts, flangeways, equipment, and drainage facilities with gravel, mud, waste materials, or timbers used for crossing tracks. Such routes shall be planned in such a way to minimize the risk of damage to Railroad facilities and must be approved by the Engineer and Railroad Engineer.

Under Section 14 Insurance add the following:

All insurance herein before specified shall be carried until the final inspection and acceptance of the project by the Department and Railroad, or acceptance of that portion of the project within NSR's corridor. At that point, no work or any other activities by the Contractor shall take place in NSR's corridor without written permission from the Department and Railroad.

Railroad Site Data:

The following information is provided as a convenience to the Contractor. This information is subject to change and the Contractor should contact the Railroad to verify the accuracy. Since this information is shown as a convenience to the Contractor, but is subject to change, the Contractor shall have no claims whatsoever against either the Railroad or the Department for any delays or additional costs incurred based on changes in this information.

Number of tracks	-	2 Main Tracks, 1 Siding Track
Number of trains per day	-	31
Type of trains per day	-	2 Passenger and 29 Freight
Maximum speed of trains	-	79 mph (Passenger), 60 mph (Freight)

The Description and Designation identified in Section 14, Part A, Paragraph 2, subsection d and e, shall read:

*Construction of new railroad roadbed, bridges, utility relocation, passenger platform, and supporting infrastructure adjacent to the tracks owned and operated by Norfolk Southern Railway in Mecklenburg County, North Carolina, identified as State TIP P-5705BA and P-5705BB and Federal Project STBGDA-1001(079) and FR-TII-0047-17.*

At the end of Section 5, Part D, Paragraph 2, add the following:

The procedure for doing such work, including need of and plans for shoring, shall first be reviewed by the Engineer then reviewed and approved by the Railroad Engineer, but such approval shall not relieve the Contractor from liability.

Under Section 15 Failure to Comply add the following:

Failure to comply with any safety requirements within the railroad right of way may

## RR-51

result in the removal of the individual or individuals responsible for violation of policies. Depending upon the severity of the violation as determined by the Railroad Engineer, RWIC/flagman or the Engineer, the individual or individuals implicated must leave the RR right of way within 1 hour of notification of the violation. Depending on the severity of the violation, the individual or individuals who were involved in the incident may be able to return to the job the following day. That determination will be made by the RWIC and the Engineer on site. The individual or individuals will be notified if they are allowed to return the following day by the close of business the day of the occurrence. If they are not allowed to return the next day, the contractor may file an appeal to the Engineer requesting the individual or individuals accused of the violation be allowed to return to the job. The Engineer will then notify the Railroad of the appeal and a meeting will be held to determine if the individual or individuals will or will not be allowed to return to the job. The individual or individuals alleged to have committed the violation will not be allowed on the project until after the Railroad Engineer and Engineer have reviewed the appeal and made a determination if the individual or individuals may return. If a person is allowed return to the site after the appeal process and a second violation of policies occurs, that will be grounds for permanent removal of the individual from the worksite. This does not only apply to individuals, but may apply to entire crews as well depending on the circumstances and severity of the violation of policy. The contractor shall have no claims whatsoever against the Railroad or the Department for any delays or additional cost incurred as a result of safety violations and removal of the individual or individuals from the job.

Add the following section:

### FEDERAL RAILROAD ADMINISTRATION (FRA) SAFETY REQUIREMENTS

In addition to NSR safety guidelines, the Contractor will be required to adhere to the safety requirements of the Federal Railroad Administration and comply with Title 49, Volume 4, Chapter 2, Part 213 and 214 of the Code of Federal Regulations. This information can be found at the following link:

<https://www.gpo.gov/fdsys/granule/CFR-2011-title49-vol4/CFR-2011-title49-vol4-part213>

The FRA may conduct inspections on this project and fines can be levied against both the individual cited and the contractor for violations of these policies. The contractor shall have no claims whatsoever against the Railroad or the Department for any delays or additional cost incurred as a result of violations and fines for noncompliance with the above FRA guidelines.

Any and all temporary shoring which is subject to railroad loading, whether included in the contract plans or designed by the contractor, has been and shall be designed to meet the requirements of railroad loading and the requirements laid out in Appendix A and also shall be constructed, installed, operated, removed, and/or abandoned in place as required by the terms of Appendix A.

Projects P-5705BA, P-5705BB

**ST-1**

Mecklenburg County

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STRUCTURE****Table of Contents**

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David W. Hawkins

David W. Hawkins's  
seal applies to Special  
Provisions defined  
from pages ST-3  
through ST-83.



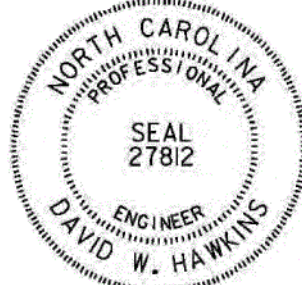
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4/5/2018



David W. Hawkins  
David W. Hawkins's seal applies to Special Provisions defined from pages ST-3 through ST-82

4/5/2018



Paul Roepnack's seal applies to Special Provisions defined from pages ST-95 through ST-95.

4/6/2018



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**Mecklenburg County**

**TERMS AND DEFINITIONS**

**(SPECIAL)**

Unless noted otherwise, the following terms and their associated definitions are applicable throughout these Project Special Provisions:

Terms

Definitions

Railway, Railway Company,  
Railroad, Railroad Company

Norfolk Southern Corporation

Railroad Engineer

The authorized representative of the Railway.

AREMA

American Railway Engineering and  
Maintenance-of-Way Association.

NCDOT, Department,  
Department of Transportation

North Carolina Department of Transportation.

Standard Specifications,  
Specifications

NCDOT Standard Specifications for Roads and  
Structures, January 2018.

Engineer, Department's Engineer  
Project Engineer, Highway Engineer

The authorized representative of the NCDOT.

Inspector, Department's Inspector

The authorized inspector of the NCDOT.

**Projects P-5705BA, P-5705BB****ST-4****Mecklenburg County****MAINTENANCE AND PROTECTION OF TRAFFIC  
BENEATH PROPOSED STRUCTURE AT STATION 15+39.55 –S1–****(8-13-04)****1.0 GENERAL**

Maintain traffic on W 6<sup>th</sup> Street as shown in Traffic Control Plans and as directed by the Engineer.

Provide a minimum temporary vertical clearance of 15'-0" at all times during construction.

Submit plans and calculations for review and approval for protecting traffic and bracing girders, as described herein, at the above station before beginning work at this location. Have the drawings and design calculations prepared, signed, and sealed by a North Carolina Registered Professional Engineer. The approval of the Engineer will not relieve the Contractor of the responsibility for the safety of the method or equipment.

**2.0 PROTECTION OF TRAFFIC**

Protect traffic from any operation that affords the opportunity for construction materials, equipment, tools, etc. to be dropped into the path of traffic beneath the structure. This applies to both pedestrian and motor vehicle traffic. Based on Contractor means and methods determine and clearly define all dead and live loads for this system, which, at a minimum, shall be installed between beams or girders over any travelway or shoulder area where traffic is maintained. Install the protective system before beginning any construction operations over traffic. In addition, for these same areas, keep the overhang falsework in place until after the rails have been poured.

**3.0 BRACING GIRDERS**

Brace girders to resist wind forces, weight of forms and other temporary loads, especially those eccentric to the vertical axis of the member during all stages of erection and construction. Before casting of intermediate diaphragms, decks, or connecting steel diaphragms do not allow the horizontal movement of girders to exceed ½ inch.

**4.0 BASIS OF PAYMENT**

Payment at the contract unit prices for the various pay items will be full compensation for the above work.

**Projects P-5705BA, P-5705BB****ST-5****Mecklenburg County****MAINTENANCE AND PROTECTION OF TRAFFIC**  
**BENEATH PROPOSED STRUCTURE AT STATION 18+82.25 –S1–**  
**AND 18+79.37 – S2-****(8-13-04)****1.0 GENERAL**

Maintain traffic on W 5<sup>th</sup> Street as shown in Traffic Control Plans and as directed by the Engineer.

Provide a minimum temporary vertical clearance of 15'-0" at all times during construction.

Submit plans and calculations for review and approval for protecting traffic and bracing girders, as described herein, at the above station before beginning work at this location. Have the drawings and design calculations prepared, signed, and sealed by a North Carolina Registered Professional Engineer. The approval of the Engineer will not relieve the Contractor of the responsibility for the safety of the method or equipment.

**2.0 PROTECTION OF TRAFFIC**

Protect traffic from any operation that affords the opportunity for construction materials, equipment, tools, etc. to be dropped into the path of traffic beneath the structure. This applies to both pedestrian and motor vehicle traffic. Based on Contractor means and methods determine and clearly define all dead and live loads for this system, which, at a minimum, shall be installed between beams or girders over any travelway or shoulder area where traffic is maintained. Install the protective system before beginning any construction operations over traffic. In addition, for these same areas, keep the overhang falsework in place until after the rails have been poured.

**3.0 BRACING GIRDERS**

Brace girders to resist wind forces, weight of forms and other temporary loads, especially those eccentric to the vertical axis of the member during all stages of erection and construction. Before casting of intermediate diaphragms, decks, or connecting steel diaphragms do not allow the horizontal movement of girders to exceed 1/2 inch.

**4.0 BASIS OF PAYMENT**

Payment at the contract unit prices for the various pay items will be full compensation for the above work.

**Projects P-5705BA, P-5705BB****ST-6****Mecklenburg County****MAINTENANCE AND PROTECTION OF TRAFFIC**  
**BENEATH PROPOSED STRUCTURE AT STATION 23+65.83 -S1-**  
**AND 23+62.98 -S2-****(8-13-04)****1.0 GENERAL**

Maintain traffic on W Trade Street as shown in Traffic Control Plans and as directed by the Engineer.

Provide a minimum temporary vertical clearance of 15'-0" at all times during construction.

Submit plans and calculations for review and approval for protecting traffic and bracing girders, as described herein, at the above station before beginning work at this location. Have the drawings and design calculations prepared, signed, and sealed by a North Carolina Registered Professional Engineer. The approval of the Engineer will not relieve the Contractor of the responsibility for the safety of the method or equipment.

**2.0 PROTECTION OF TRAFFIC**

Protect traffic from any operation that affords the opportunity for construction materials, equipment, tools, etc. to be dropped into the path of traffic beneath the structure. This applies to both pedestrian and motor vehicle traffic. Based on Contractor means and methods determine and clearly define all dead and live loads for this system, which, at a minimum, shall be installed between beams or girders over any travelway or shoulder area where traffic is maintained. Install the protective system before beginning any construction operations over traffic. In addition, for these same areas, keep the overhang falsework in place until after the rails have been poured.

**3.0 BRACING GIRDERS**

Brace girders to resist wind forces, weight of forms and other temporary loads, especially those eccentric to the vertical axis of the member during all stages of erection and construction. Before casting of intermediate diaphragms, decks, or connecting steel diaphragms do not allow the horizontal movement of girders to exceed 1/2 inch.

**4.0 BASIS OF PAYMENT**

Payment at the contract unit prices for the various pay items will be full compensation for the above work.

**Projects P-5705BA, P-5705BB****ST-7****Mecklenburg County****MAINTENANCE AND PROTECTION OF TRAFFIC  
BENEATH PROPOSED STRUCTURE AT STATION 28+17.22 -S1-  
AND 28+12.88 -S2-****(8-13-04)****1.0 GENERAL**

Maintain traffic on W 4<sup>th</sup> Street as shown in Traffic Control Plans and as directed by the Engineer.

Provide a minimum temporary vertical clearance of 15'-0" at all times during construction.

Submit plans and calculations for review and approval for protecting traffic and bracing girders, as described herein, at the above station before beginning work at this location. Have the drawings and design calculations prepared, signed, and sealed by a North Carolina Registered Professional Engineer. The approval of the Engineer will not relieve the Contractor of the responsibility for the safety of the method or equipment.

**2.0 PROTECTION OF TRAFFIC**

Protect traffic from any operation that affords the opportunity for construction materials, equipment, tools, etc. to be dropped into the path of traffic beneath the structure. This applies to both pedestrian and motor vehicle traffic. Based on Contractor means and methods determine and clearly define all dead and live loads for this system, which, at a minimum, shall be installed between beams or girders over any travelway or shoulder area where traffic is maintained. Install the protective system before beginning any construction operations over traffic. In addition, for these same areas, keep the overhang falsework in place until after the rails have been poured.

**3.0 BRACING GIRDERS**

Brace girders to resist wind forces, weight of forms and other temporary loads, especially those eccentric to the vertical axis of the member during all stages of erection and construction. Before casting of intermediate diaphragms, decks, or connecting steel diaphragms do not allow the horizontal movement of girders to exceed 1/2 inch.

**4.0 BASIS OF PAYMENT**

Payment at the contract unit prices for the various pay items will be full compensation for the above work.

**Projects P-5705BA, P-5705BB****ST-8****Mecklenburg County****MAINTENANCE AND PROTECTION OF TRAFFIC**  
**BENEATH PROPOSED STRUCTURE AT STATION 42+59.46 -A1-****(8-13-04)****1.0 GENERAL**

Maintain traffic on Greenway Trail as shown in Traffic Control Plans and as directed by the Engineer.

Provide a minimum temporary vertical clearance of 9'-0" and horizontal clearance of 11'-0" at all times during construction.

Submit plans and calculations for review and approval for protecting traffic and bracing girders, as described herein, at the above station before beginning work at this location. Have the drawings and design calculations prepared, signed, and sealed by a North Carolina Registered Professional Engineer. The approval of the Engineer will not relieve the Contractor of the responsibility for the safety of the method or equipment.

**2.0 PROTECTION OF TRAFFIC**

Protect traffic from any operation that affords the opportunity for construction materials, equipment, tools, etc. to be dropped into the path of traffic beneath the structure. This applies to both pedestrian and motor vehicle traffic. Based on Contractor means and methods determine and clearly define all dead and live loads for this system, which, at a minimum, shall be installed between beams or girders over any travelway or shoulder area where traffic is maintained. Install the protective system before beginning any construction operations over traffic. In addition, for these same areas, keep the overhang falsework in place until after the rails have been poured.

**3.0 BRACING GIRDERS**

Brace girders to resist wind forces, weight of forms and other temporary loads, especially those eccentric to the vertical axis of the member during all stages of erection and construction. Before casting of intermediate diaphragms, decks, or connecting steel diaphragms do not allow the horizontal movement of girders to exceed 1/2 inch.

**4.0 BASIS OF PAYMENT**

Payment at the contract unit prices for the various pay items will be full compensation for the above work.

**Projects P-5705BA, P-5705BB****ST-9****Mecklenburg County****APPLICATION OF BRIDGE COATING****(8-9-13)****GENERAL**

This work consists of preparing and cleaning concrete and galvanized surfaces as well as furnishing and applying a colored base coating with a compatible anti-graffiti finish coating to the surfaces described herein. The base coating and anti-graffiti coating shall be applied to all surfaces indicated on the plans or as directed by the Engineer and shall be applied only after the surface preparation specified herein has been completed, inspected and approved by the Engineer.

Alternate coating methods may be submitted for review and approval.

**MATERIALS**

The base coating shall be compatible with the anti-graffiti finish coating and must be designed specifically for coating galvanized surfaces or damp, uncured concrete. The coating material shall be delivered to the job site in sealed containers bearing the manufacturer's original labels. The brand, color, and type shall be clearly marked on each container. A copy of the manufacturer's Materials Safety Data Sheet and a copy of the manufacturer's printed instructions shall be presented to the Engineer at the time of delivery.

The coating material shall be stored in airtight, upright containers. The containers shall be stored in a dry location where the temperature remains above 40° F and less than 100° F.

The coating material shall have a shelf life of not less than 12 months. After application, the base coating shall be dry to the touch within 48 hours and shall achieve a final cure within 2 to 3 weeks under ideal conditions. After application, the anti-graffiti coating shall be dry to the touch within 1 hour and shall achieve a final cure within 3 hours.

The color of the base coating shall be in accordance with the Federal Standard 595. Colors and areas of application shall be as follows:

**Superstructure**

FS 36622 (Gray) or similar color approved by the Engineer shall be applied to the tops, interior and exterior faces of the barrier rails, exterior vertical edges of deck, bottoms of overhang.

**Substructure**

FS 36251 (Gray) or similar color approved by the Engineer shall be applied to all exposed substructure elements, excluding top surfaces of bent and end bent caps and concrete slope protection.

The color of the anti-graffiti coating shall be clear after full cure.



**Projects P-5705BA, P-5705BB****ST-10****Mecklenburg County**

Provide one gallon of graffiti remover, thinners, dryers and all necessary components recommended by the manufacturer to the North Carolina Department of Transportation Materials and Tests Unit, Chemical Testing Engineer.

**MATERIAL TESTING AND CERTIFICATION**

Before coating material is applied, a Type 2 certification shall be supplied attesting that the product furnished is in accordance with the same formula as that previously subjected to the tests specified below and approved. Copies of the current tests reports shall be attached to the certification. Reports for tests made more than 4 years prior to shipment to the project site will not be accepted.

All testing shall be performed by a qualified commercial testing laboratory that has been approved by the North Carolina Department of Transportation Materials and Tests Unit.

The applied coating shall be subjected to and shall satisfy the requirements of the tests listed below, prior to use on the structure.

Freeze-Thaw

1. Three concrete specimens, not less than 4 inches by 6 inches by 6 inches, of the mix design for the structure shall be cast and cured. Fourteen days moist curing with a drying period at room temperature, 60° F to 80° F, for 24 hours will be required before applying the coating material to the specimens. Caution shall be taken that there be no excessive oil on specimen forms. The coating shall be applied to the sides of specimens at a spreading rate of  $50 \pm 10$  square feet per gallon. Brush application will be permitted. Cementitious coatings shall be cured at room temperature and 30 percent relative humidity for 24 hours, at room temperature and 90 percent relative humidity for 48 hours, at room temperature and 50 percent relative humidity for 4 days for a total curing time of 7 days.
2. The specimens shall be immersed in water at room temperature for 3 hours, then removed.
3. The specimens shall be placed in cold storage at -15°F for 1 hour and then removed.
4. The specimens shall be thawed at room temperature for one hour.
5. Steps 3 and 4 shall be repeated for a total of 250 cycles. At the end of 250 cycles, the specimens shall show no visible defects.

Accelerated Weathering

Coating shall be subjected to a 7,500 hour exposure test in a Twin-Carbon-Arc-Weatherometer, ASTM G 23, Type D, at an opening temperature of 145° F. The test shall be made at 20-minute cycles consisting of 17 minutes of light and 3 minutes of water spray plus light. At the end of the exposure test, the exposed samples shall show no chipping, flaking, or peeling. The panels for this test shall be prepared by applying the coating at a spreading rate of  $50 \pm 10$  square feet per gallon to both sides and edges of panels cut from

**Projects P-5705BA, P-5705BB****ST-11****Mecklenburg County**

asbestos cement shingles in accordance with Federal Specification SS-S-346, Type I. Curing time shall be in accordance with Freeze-Thaw Test curing time.

**Fungus Growth Resistance**

Coating shall pass a fungus resistance test in accordance with Federal Specification TT-P-29g. Fungus growth shall not be indicated after a minimum incubation period of 21 days.

**Abrasion Resistance**

Coating shall pass the 2,000 litre sand abrasion test in accordance with Method 6191 Abrasion Resistance-Falling Sand, Federal Test Method Standard 141a, ASTM D968-81. The specimens for this test shall be prepared by applying the coating to a cleaned steel panel at a spreading rate of  $50 \pm 10$  square feet per gallon. The specimens shall be cured at room temperature for 21 days.

**Impact Resistance**

Coating shall be applied to a concrete panel prepared according to Federal Test Method Standard 141a, Method 2051, at a spreading rate of  $50 \pm 10$  square feet per gallon, and allowed to cure for 21 days at room temperature. The test shall then be run using the Gardner Mandrel Impact Tester in accordance with ASTM D 2794 using a one-half inch indenter with an impact load of 6 inch-pounds. The coating shall show no chipping under this impact load.

**Salt-Spray Resistance**

A concrete specimen shall be coated at the rate of  $50 \pm 10$  square feet per gallon and cured for 21 days at room temperature. The coated specimen shall be exposed to a 5 percent salt solution in accordance with ASTM B 117 for 2,500 hours where the atmospheric temperature is maintained at  $90^\circ \pm 2^\circ\text{F}$ . At the end of 2,500 hours of exposure, the coating shall show no ill effects, loss of adhesion, or deterioration.

**Flexibility**

A sheet metal specimen shall be coated at a rate of  $50 \pm 10$  square feet per gallon and allowed to cure for 48 hours at room temperature. The coated specimen shall be bent 180 degrees over a one inch round mandrel. After bending, the coating shall show no breaking.

In addition to submitting the certification and test reports required above, a service record shall be supplied showing that the coating material has a satisfactory service record on concrete and, when applicable, galvanized surfaces for a period of not less than 5 years prior to the date of submission of the service record. The coating shall also have shown satisfactory service characteristics without peeling, chipping, flaking, and non-uniform change in texture or color. The structure for the specific product shall be named in the service record.

In addition to the above requirements, each batch delivered to the project shall be sampled and tested for color and the following product analysis data submitted:

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- (a) Weight per gallon
- (b) Viscosity in Krieb units
- (c) Weight percent pigment
- (d) Weight percent vehicle solids
- (e) Infrared spectra of vehicle solution
- (f) Drying time

**SURFACE PREPARATION**

Prepare concrete surfaces and galvanized surfaces in accordance with Section 420-17(B) and Section 442-12 of the Standard Specifications, respectively, or the manufacturer's recommendations, whichever is more restrictive. All surfaces to be coated shall be free of efflorescence, flaking coatings, dirt, oil, curing compounds, release agents and other deleterious substances prior to the application of the coating.

Concrete curing compounds and release agents must be removed. Water blasting will be allowed; however, the blasting operation must not remove or damage the concrete.

Prior to application of the coating, all concrete surfaces to be coated shall be sprayed with water. If the water soaks into the concrete surfaces, the coating may be applied once all surfaces dry. If the water beads up and is repelled, the surfaces require further cleaning before application of the coating.

**APPLICATION**

The coating application, including equipment used, shall be in accordance with the manufacturer's recommendations. The coating shall be applied by qualified personnel with previous experience similar to the work outlined in the contract plans.

The material shall be thoroughly mixed in its original container and shall not be thinned. Containers with coatings that have formed skins shall not be permitted for use.

The base coating may be applied over damp, but not wet concrete surfaces and shall be applied at a rate of  $50 \pm 10$  square feet per gallon. The application rate shall produce a uniform color texture. The base coating shall be applied only when the ambient temperature is between 40° F and rising, and 100° F. It shall not be applied over frozen surfaces or if rain is imminent. If a freshly applied surface is damaged by rain, re-coating may be necessary based on the Engineers assessment of the damage.

Schedule the application of the base coating as one of the final finishing operations or when construction-generated dust will be minimal. To prevent lap marks, a wet edge shall be maintained at all times. Stopping and starting in mid-sections will not be allowed. Start or end at natural breaks in the surface, i.e. at a panel edges, corners or joints. When applying the base coating with a roller, the material shall be applied in vertical strokes initially, cross rolled for even film and appearance, and then finished with vertical strikes.

**Projects P-5705BA, P-5705BB****ST-13****Mecklenburg County**

Apply the anti-graffiti coating by brush, roller or airless spray when the ambient temperature is between 45° F and 90° F, and the surface temperature is between 50° F and 100° F. Ensure the surface is clean and dry before applying the anti-graffiti coating.

**FINISHED PRODUCT**

All coating material in the finished state shall be capable of accommodating the thermal and elastic expansion ranges of the concrete or, when applicable, galvanized surfaces without cracking.

The texture of the completed finish coat shall be similar to that of rubbed concrete. The completed finished coating shall be tightly bonded to the structure and present a uniform appearance and texture. Additional coats may be required by the Engineer in order to produce the desired surface texture and uniformity.

Coatings shall be entirely removed from the structure and reapplied if there is failure to positively adhere as evident by chipping, flaking, peeling, or the desired surface appearance is not achieved.

The average thickness of the completed finish coating shall not exceed 1/8 of an inch. The minimum dry film thickness of the anti-graffiti coating shall be 2.0 mils.

**BASIS OF PAYMENT**

The bridge coating will be paid for at the contract lump sum price bid for "Application of Bridge Coating." Price and payment shall be full compensation for surface preparation, furnishing and applying the materials, labor, equipment and any incidentals necessary to complete this work.

**Projects P-5705BA, P-5705BB****ST-14****Mecklenburg County****TEMPORARY RAILROAD SHORING****(3-6-09)****1.0 GENERAL**

Provide temporary railroad shoring for each bent indicated in the plans in accordance with AREMA guidelines as well as Standard Specifications and this Special Provision.

**2.0 ALTERNATE DESIGN AND PLANS**

The submittal of an alternate design and plans for excavation and shoring is permitted in lieu of the excavation and shoring detailed on the plans. The alternate design shall be in accordance with the current railway design criteria. Have the alternate design computations and plans sealed by a North Carolina Registered Professional Engineer and submit them for review, comments and acceptance. After the appropriate State agency accepts them, they are submitted by the State agency to the Railroad for review, comments and acceptance. Allow a minimum of 30 days for the Railroad's review. Do not begin excavation at the excavation site or sites in question until the Engineer confirms that both the State and Railroad accept the alternate design and plans. No extension of intermediate completion dates and/or final completion dates will be allowed due to delays in review of alternate excavation and shoring design and plans.

**3.0 BASIS OF PAYMENT**

Payment for the temporary railroad shoring will be made at the lump sum price bid for "Temporary Railroad Shoring for \_\_\_\_\_". Such lump sum price will be full compensation for all materials, equipment, tools, labor, and incidentals necessary to complete the work.

**Projects P-5705BA, P-5705BB****ST-15****Mecklenburg County****FALSEWORK AND FORMWORK****(4-5-12)****1.0 DESCRIPTION**

Use this Special Provision as a guide to develop temporary works submittals required by the Standard Specifications or other provisions; no additional submittals are required herein. Such temporary works include, but are not limited to, falsework and formwork.

Falsework is any temporary construction used to support the permanent structure until it becomes self-supporting. Formwork is the temporary structure or mold used to retain plastic or fluid concrete in its designated shape until it hardens. Access scaffolding is a temporary structure that functions as a work platform that supports construction personnel, materials, and tools, but is not intended to support the structure. Scaffolding systems that are used to temporarily support permanent structures (as opposed to functioning as work platforms) are considered to be falsework under the definitions given. Shoring is a component of falsework such as horizontal, vertical, or inclined support members. Where the term “temporary works” is used, it includes all of the temporary facilities used in bridge construction that do not become part of the permanent structure.

Design and construct safe and adequate temporary works that will support all loads imposed and provide the necessary rigidity to achieve the lines and grades shown on the plans in the final structure. Falsework and formwork shall not be tied to or supported by existing railroad structures without prior written approval from the Engineer.

**2.0 MATERIALS**

Select materials suitable for temporary works; however, select materials that also ensure the safety and quality required by the design assumptions. The Engineer has authority to reject material on the basis of its condition, inappropriate use, safety, or nonconformance with the plans. Clearly identify allowable loads or stresses for all materials or manufactured devices on the plans. Revise the plan and notify the Engineer if any change to materials or material strengths is required.

**3.0 DESIGN REQUIREMENTS****A. Working Drawings**

Provide working drawings for items as specified in the contract, or as required by the Engineer, with design calculations and supporting data in sufficient detail to permit a structural and safety review of the proposed design of the temporary work.

On the drawings, show all information necessary to allow the design of any component to be checked independently as determined by the Engineer.

When concrete placement is involved, include data such as the drawings of proposed sequence, rate of placement, direction of placement, and location of all construction joints. Submit the number of copies as called for by the Contract Drawings and calculations are required to be prepared under the guidance of, and sealed by, a North

**Projects P-5705BA, P-5705BB****ST-16****Mecklenburg County**

Carolina Registered Professional Engineer who is knowledgeable in temporary works design.

If requested by the Engineer, submit with the working drawings manufacturer's catalog data listing the weight of all construction equipment that will be supported on the temporary work. Show anticipated total settlements and/or deflections of falsework and forms on the working drawings. Include falsework footing settlements, joint take-up, and deflection of beams or girders.

As an option for the Contractor, overhang falsework hangers may be uniformly spaced, at a maximum of 36 inches, provided the following conditions are met:

Member Type (PCG)	Member Depth, (inches)	Max. Overhang Width, (inches)	Max. Slab Edge Thickness, (inches)	Max. Screenshot Wheel Weight, (lbs.)	Bracket Min. Vertical Leg Extension, (inches)
II	36	39	14	2000	26
III	45	42	14	2000	35
IV	54	45	14	2000	44
MBT	63	51	12	2000	50
MBT	72	55	12	1700	48

Overhang width is measured from the centerline of the girder to the edge of the deck slab.

For Type II, III & IV prestressed concrete girders (PCG), 45-degree cast-in-place half hangers and rods must have a minimum safe working load of 6,000 lbs.

For MBT prestressed concrete girders, 45-degree angle holes for falsework hanger rods shall be cast through the girder top flange and located, measuring along the top of the member, 1'-2 1/2" from the edge of the top flange. Hanger hardware and rods must have a minimum safe working load of 6,000 lbs.

The overhang bracket provided for the diagonal leg shall have a minimum safe working load of 3,750 lbs. The vertical leg of the bracket shall extend to the point that the heel bears on the girder bottom flange, no closer than 4 inches from the bottom of the member. However, for 72-inch members, the heel of the bracket shall bear on the web, near the bottom flange transition.

Provide adequate overhang falsework and determine the appropriate adjustments for deck geometry, equipment, casting procedures and casting conditions.

If the optional overhang falsework spacing is used, indicate this on the falsework submittal and advise the girder producer of the proposed details. Failure to notify the Engineer of hanger type and hanger spacing on prestressed concrete girder casting drawings may delay the approval of those drawings.

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Falsework hangers that support concentrated loads and are installed at the edge of thin top flange concrete girders (such as bulb tee girders) shall be spaced so as not to exceed 75% of the manufacturer's stated safe working load. Use of dual leg hangers (such as Meadow Burke HF-42 and HF-43) are not allowed on concrete girders with thin top flanges. Design the falsework and forms supporting deck slabs and overhangs on girder bridges so that there will be no differential settlement between the girders and the deck forms during placement of deck concrete.

When staged construction of the bridge deck is required, detail falsework and forms for screed and fluid concrete loads to be independent of any previous deck pour components when the mid-span girder deflection due to deck weight is greater than  $\frac{3}{4}$ ".

Note on the working drawings any anchorages, connectors, inserts, steel sleeves or other such devices used as part of the falsework or formwork that remains in the permanent structure. If the plan notes indicate that the structure contains the necessary corrosion protection required for a Corrosive Site, epoxy coat, galvanize or metalize these devices. Electroplating will not be allowed. Any coating required by the Engineer will be considered incidental to the various pay items requiring temporary works.



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Design falsework and formwork requiring submittals in accordance with the 1995 AASHTO *Guide Design Specifications for Bridge Temporary Works* except as noted herein.

1. Wind Loads

Table 2.2 of Article 2.2.5.1 is modified to include wind velocities up to 110 mph. In addition, Table 2.2A is included to provide the maximum wind speeds by county in North Carolina.

**Table 2.2 - Wind Pressure Values**

Height Zone feet above ground	Pressure, lb/ft <sup>2</sup> for Indicated Wind Velocity, mph				
	70	80	90	100	110
0 to 30	15	20	25	30	35
30 to 50	20	25	30	35	40
50 to 100	25	30	35	40	45
over 100	30	35	40	45	50

2. Time of Removal

The following requirements replace those of Article 3.4.8.2.

Do not remove forms until the concrete has attained strengths required in Article 420-16 of the Standard Specifications and these Special Provisions.

Do not remove forms until the concrete has sufficient strength to prevent damage to the surface.

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## Mecklenburg County

Table 2.2A - Steady State Maximum Wind Speeds by Counties in North Carolina

COUNTY	25 YR (mph)	COUNTY	25 YR (mph)	COUNTY	25 YR (mph)
Alamance	70	Franklin	70	Pamlico	100
Alexander	70	Gaston	70	Pasquotank	100
Alleghany	70	Gates	90	Pender	100
Anson	70	Graham	80	Perquimans	100
Ashe	70	Granville	70	Person	70
Avery	70	Greene	80	Pitt	90
Beaufort	100	Guilford	70	Polk	80
Bertie	90	Halifax	80	Randolph	70
Bladen	90	Harnett	70	Richmond	70
Brunswick	100	Haywood	80	Robeson	80
Buncombe	80	Henderson	80	Rockingham	70
Burke	70	Hertford	90	Rowan	70
Cabarrus	70	Hoke	70	Rutherford	70
Caldwell	70	Hyde	110	Sampson	90
Camden	100	Iredell	70	Scotland	70
Carteret	110	Jackson	80	Stanley	70
Caswell	70	Johnston	80	Stokes	70
Catawba	70	Jones	100	Surry	70
Cherokee	80	Lee	70	Swain	80
Chatham	70	Lenoir	90	Transylvania	80
Chowan	90	Lincoln	70	Tyrell	100
Clay	80	Macon	80	Union	70
Cleveland	70	Madison	80	Vance	70
Columbus	90	Martin	90	Wake	70
Craven	100	McDowell	70	Warren	70
Cumberland	80	Mecklenburg	70	Washington	100
Currituck	100	Mitchell	70	Watauga	70
Dare	110	Montgomery	70	Wayne	80
Davidson	70	Moore	70	Wilkes	70
Davie	70	Nash	80	Wilson	80
Duplin	90	New Hanover	100	Yadkin	70
Durham	70	Northampton	80	Yancey	70
Edgecombe	80	Onslow	100		
Forsyth	70	Orange	70		

**Projects P-5705BA, P-5705BB****ST-20****Mecklenburg County****B. Review and Approval**

The Engineer is responsible for the review and approval of temporary works' drawings.

Submit the working drawings sufficiently in advance of proposed use to allow for their review, revision (if needed), and approval without delay to the work.

The time period for review of the working drawings does not begin until complete drawings and design calculations, when required, are received by the Engineer.

Do not start construction of any temporary work for which working drawings are required until the drawings have been approved. Such approval does not relieve the Contractor of the responsibility for the accuracy and adequacy of the working drawings.

**4.0 CONSTRUCTION REQUIREMENTS**

All requirements of Section 420 of the Standard Specifications apply.

Construct temporary works in conformance with the approved working drawings. Ensure that the quality of materials and workmanship employed is consistent with that assumed in the design of the temporary works. Do not weld falsework members to any portion of the permanent structure unless approved. Show any welding to the permanent structure on the approved construction drawings.

Provide tell-tales attached to the forms and extending to the ground, or other means, for accurate measurement of falsework settlement. Make sure that the anticipated compressive settlement and/or deflection of falsework does not exceed 1 inch. For cast-in-place concrete structures, make sure that the calculated deflection of falsework flexural members does not exceed 1/240 of their span regardless of whether or not the deflection is compensated by camber strips.

**A. Maintenance and Inspection**

Inspect and maintain the temporary work in an acceptable condition throughout the period of its use. Certify that the manufactured devices have been maintained in a condition to allow them to safely carry their rated loads. Clearly mark each piece so that its capacity can be readily determined at the job site.

Perform an in-depth inspection of an applicable portion(s) of the temporary works, in the presence of the Engineer, not more than 24 hours prior to the beginning of each concrete placement. Inspect other temporary works at least once a month to ensure that they are functioning properly. Have a North Carolina Registered Professional Engineer inspect the cofferdams, shoring, sheathing, support of excavation structures, and support systems for load tests prior to loading.

**B. Foundations**

**Projects P-5705BA, P-5705BB****ST-21****Mecklenburg County**

Determine the safe bearing capacity of the foundation material on which the supports for temporary works rest. If required by the Engineer, conduct load tests to verify proposed bearing capacity values that are marginal or in other high-risk situations.

The use of the foundation support values shown on the contract plans of the permanent structure is permitted if the foundations are on the same level and on the same soil as those of the permanent structure.

Allow for adequate site drainage or soil protection to prevent soil saturation and washout of the soil supporting the temporary works supports.

If piles are used, the estimation of capacities and later confirmation during construction using standard procedures based on the driving characteristics of the pile is permitted. If preferred, use load tests to confirm the estimated capacities; or, if required by the Engineer conduct load tests to verify bearing capacity values that are marginal or in other high risk situations.

The Engineer reviews and approves the proposed pile and soil bearing capacities.

**5.0 REMOVAL**

Unless otherwise permitted, remove and keep all temporary works upon completion of the work. Do not disturb or otherwise damage the finished work.

Remove temporary works in conformance with the contract documents. Remove them in such a manner as to permit the structure to uniformly and gradually take the stresses due to its own weight.

**6.0 METHOD OF MEASUREMENT**

Unless otherwise specified, temporary works will not be directly measured.

**7.0 BASIS OF PAYMENT**

Payment at the contract unit prices for the various pay items requiring temporary works will be full compensation for the above falsework and formwork.

**Projects P-5705BA, P-5705BB****ST-22****Mecklenburg County****SUBMITTAL OF WORKING DRAWINGS****(6-28-17)****1.0 GENERAL**

Submit working drawings in accordance with Article 105-2 of the *Standard Specifications* and this provision. For this provision, “submittals” refers to only those listed in this provision. The list of submittals contained herein does not represent a list of required submittals for the project. Submittals are only necessary for those items as required by the contract. All working drawing submittals to the Structures Management unit will also need to be copied to the Resident Engineer in electronic format. Either the Structure Design Unit or the Geotechnical Engineering Unit or both units will jointly review submittals. The Railway will also render a disposition on these submittals.

If a submittal contains variations from plan details or specifications or significantly affects project cost, field construction or operations, discuss the submittal with and submit all copies to the Engineer. State the reason for the proposed variation in the submittal. To minimize review time, make sure all submittals are complete when initially submitted. Provide a contact name and information with each submittal. Direct any questions regarding submittal requirements to the Engineer, Structures Management Unit contacts or the Geotechnical Engineering Unit contacts noted below.

In order to facilitate in-plant inspection by NCDOT and approval of working drawings, provide the name, address and telephone number of the facility where fabrication will actually be done if different than shown on the title block of the submitted working drawings. This includes, but is not limited to, precast concrete items, prestressed concrete items and fabricated steel or aluminum items.

**2.0 ADDRESSES AND CONTACTS**

For submittals to the Structure Design Unit, use the following addresses:

Via US mail:

Mr. B. C. Hanks, P. E.  
 State Structures Engineer  
 North Carolina Department  
 of Transportation  
 Structures Management Unit  
 1581 Mail Service Center  
 Raleigh, NC 27699-1581  
 Attention: Mr. J. L. Bolden, P. E.

Via other delivery service:

Mr. B. C. Hanks, P. E.  
 State Structures Engineer  
 North Carolina Department  
 of Transportation  
 Structures Management Unit  
 1000 Birch Ridge Drive  
 Raleigh, NC 27610  
 Attention: Mr. J. L. Bolden, P. E.

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**Mecklenburg County**

Submittals may also be made via email.

Send submittals to:

[jlbolden@ncdot.gov](mailto:jlbolden@ncdot.gov) (James Bolden)

Send an additional e-copy of the submittal to the following address:

[eomile@ncdot.gov](mailto:eomile@ncdot.gov) (Emmanuel Omile)

[mrorie@ncdot.gov](mailto:mrorie@ncdot.gov) (Madonna Rorie)

For submittals to the Geotechnical Engineering Unit, use the following addresses:

For projects in Divisions 1-7, use the following Eastern Regional Office address:

Via US mail:

Mr. Chris Kreider, P. E.  
Eastern Regional Geotechnical  
Manager  
North Carolina Department  
of Transportation  
Geotechnical Engineering Unit  
Eastern Regional Office  
1570 Mail Service Center  
Raleigh, NC 27699-1570

Via other delivery service:

Mr. Chris Kreider, P. E.  
Eastern Regional Geotechnical  
Manager  
North Carolina Department  
of Transportation  
Geotechnical Engineering Unit  
Eastern Regional Office  
3301 Jones Sausage Road, Suite 100  
Garner, NC 27529

Via Email: [EastGeotechnicalSubmittal@ncdot.gov](mailto:EastGeotechnicalSubmittal@ncdot.gov)

For projects in Divisions 8-14, use the following Western Regional Office address:

Via US mail or other delivery service:

Mr. Eric Williams, P. E.  
Western Regional Geotechnical  
Manager  
North Carolina Department  
of Transportation  
Geotechnical Engineering Unit  
Western Regional Office  
5253 Z Max Boulevard  
Harrisburg, NC 28075

Via Email: [WestGeotechnicalSubmittal@ncdot.gov](mailto:WestGeotechnicalSubmittal@ncdot.gov)

The status of the review of structure-related submittals sent to the Structure Management Unit can be viewed from the Unit's web site, via the "Drawing Submittal Status" link.

The status of the review of geotechnical-related submittals sent to the Geotechnical Engineering Unit can be viewed from the Unit's website, via the "Geotechnical Construction Submittals" link.

**Projects P-5705BA, P-5705BB****ST-24****Mecklenburg County**

Direct any questions concerning submittal review status, review comments or drawing markups to the following contacts:

Primary Structures Contact: James Bolden (919) 707 – 6408  
(919) 250 – 4082 facsimile  
[jlbolden@ncdot.gov](mailto:jlbolden@ncdot.gov)

Secondary Structures Contacts: Emmanuel Omile (919) 707 – 6451  
Madonna Rorie (919) 707 – 6508

Eastern Regional Geotechnical Contact (Divisions 1-7):  
Chris Kreider (919) 662 – 4710  
[ckreider@ncdot.gov](mailto:ckreider@ncdot.gov)

Western Regional Geotechnical Contact (Divisions 8-14):  
Eric Williams (704) 455 – 8902  
[ewilliams3@ncdot.gov](mailto:ewilliams3@ncdot.gov)

### 3.0 SUBMITTAL COPIES

Furnish one complete copy of each submittal, including all attachments, to the Engineer. At the same time, submit the number of hard copies shown below of the same complete submittal directly to the Structures Management Unit and/or the Geotechnical Engineering Unit.

The first table below covers “Structure Submittals”. The Engineer will receive review comments and drawing markups for these submittals from the Structures Management Unit. The second table in this section covers “Geotechnical Submittals”. The Engineer will receive review comments and drawing markups for these submittals from the Geotechnical Engineering Unit.

Unless otherwise required, submit one set of supporting calculations to either the Structures Management Unit or the Geotechnical Engineering Unit unless both units require submittal copies in which case submit a set of supporting calculations to each unit. Provide additional copies of any submittal as directed.

#### STRUCTURE SUBMITTALS

Submittal	Copies Required by Structure Design Unit	Copies Required by Geotechnical Engineering Unit	Contract Reference Requiring Submittal <sup>1</sup>
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**Projects P-5705BA, P-5705BB****ST-25****Mecklenburg County**

Arch Culvert Falsework	5	0	Plan Note, SN Sheet & “Falsework and Formwork”
Box Culvert Falsework <sup>7</sup>	5	0	Plan Note, SN Sheet & “Falsework and Formwork”
Cofferdams	6	2	Article 410-4
Foam Joint Seals <sup>6</sup>	9	0	“Foam Joint Seals”
Expansion Joint Seals (hold down plate type with base angle)	9	0	“Expansion Joint Seals”
Expansion Joint Seals (modular)	2, then 9	0	“Modular Expansion Joint Seals”
Expansion Joint Seals (strip seals)	9	0	“Strip Seals”
Falsework & Forms <sup>2</sup> (substructure)	8	0	Article 420-3 & “Falsework and Formwork”
Falsework & Forms (superstructure)	8	0	Article 420-3 & “Falsework and Formwork”
Girder Erection over Railroad	5	0	Railroad Provisions
Maintenance and Protection of Traffic Beneath Proposed Structure	8	0	“Maintenance and Protection of Traffic Beneath Proposed Structure at Station ____”
Metal Bridge Railing	8	0	Plan Note
Metal Stay-in-Place Forms	8	0	Article 420-3
Metalwork for Elastomeric Bearings <sup>4,5</sup>	7	0	Article 1072-8
Miscellaneous Metalwork <sup>4,5</sup>	7	0	Article 1072-8
Disc Bearings <sup>4</sup>	8	0	“Disc Bearings”
Overhead and Digital Message Signs (DMS) (metalwork and foundations)	13	0	Applicable Provisions
Placement of Equipment on Structures (cranes, etc.)	7	0	Article 420-20

**Structure Special Provisions****April 2018**



**Projects P-5705BA, P-5705BB****ST-26****Mecklenburg County**

Precast Concrete Box Culverts	2, then 1 reproducible	0	“Optional Precast Reinforced Concrete Box Culvert at Station ____”
Prestressed Concrete Cored Slab (detensioning sequences) <sup>3</sup>	6	0	Article 1078-11
Prestressed Concrete Deck Panels	6 and 1 reproducible	0	Article 420-3
Prestressed Concrete Girder (strand elongation and detensioning sequences)	6	0	Articles 1078-8 and 1078-11
Removal of Existing Structure over Railroad	5	0	Railroad Provisions
Revised Bridge Deck Plans (adaptation to prestressed deck panels)	2, then 1 reproducible	0	Article 420-3
Revised Bridge Deck Plans (adaptation to modular expansion joint seals)	2, then 1 reproducible	0	“Modular Expansion Joint Seals”
Sound Barrier Wall (precast items)	10	0	Article 1077-2 & “Sound Barrier Wall”
Sound Barrier Wall Steel Fabrication Plans <sup>5</sup>	7	0	Article 1072-8 & “Sound Barrier Wall”
Structural Steel <sup>4</sup>	2, then 7	0	Article 1072-8
Temporary Detour Structures	10	2	Article 400-3 & “Construction, Maintenance and Removal of Temporary Structure at Station ____”
TFE Expansion Bearings <sup>4</sup>	8	0	Article 1072-8

**FOOTNOTES**

- References are provided to help locate the part of the contract where the submittals are required. References in quotes refer to the provision by that name. Articles refer to the *Standard Specifications*.
- Submittals for these items are necessary only when required by a note on plans.

**Projects P-5705BA, P-5705BB****ST-27****Mecklenburg County**

3. Submittals for these items may not be required. A list of pre-approved sequences is available from the producer or the Materials & Tests Unit.
4. The fabricator may submit these items directly to the Structure Design Unit.
5. The two sets of preliminary submittals required by Article 1072-8 of the *Standard Specifications* are not required for these items.
6. Submittals for Fabrication Drawings are not required. Submittals for Catalogue Cuts of Proposed Material are required. See Section 5.A of the referenced provision.
7. Submittals are necessary only when the top slab thickness is 18” or greater.

**GEOTECHNICAL SUBMITTALS**

<b>Submittal</b>	<b>Copies Required by Geotechnical Engineering Unit</b>	<b>Copies Required by Structure Design Unit</b>	<b>Contract Reference Requiring Submittal <sup>1</sup></b>
Drilled Pier Construction Plans <sup>2</sup>	1	0	Subarticle 411-3(A)
Crosshole Sonic Logging (CSL) Reports <sup>2</sup>	1	0	Subarticle 411-5(A)(2)
Pile Driving Equipment Data Forms <sup>2,3</sup>	1	0	Subarticle 450-3(D)(2)
Pile Driving Analyzer (PDA) Reports <sup>2</sup>	1	0	Subarticle 450-3(F)(3)
Retaining Walls <sup>4</sup>	8 drawings, 2 calculations	2 drawings	Applicable Provisions
Temporary Shoring <sup>4</sup>	5 drawings, 2 calculations	2 drawings	“Temporary Shoring” & “Temporary Soil Nail Walls”

**FOOTNOTES**

1. References are provided to help locate the part of the contract where the submittals are required. References in quotes refer to the provision by that name. Subarticles refer to the *Standard Specifications*.
2. Submit one hard copy of submittal to the Engineer. Submit a second copy of submittal electronically (PDF via email), US mail or other delivery service to the appropriate Geotechnical Engineering Unit regional office. Electronic submission is preferred.
3. The Pile Driving Equipment Data Form is available from:  
[https://connect.ncdot.gov/resources/Geological/Pages/Geotech\\_Forms\\_Details.aspx](https://connect.ncdot.gov/resources/Geological/Pages/Geotech_Forms_Details.aspx)

**Projects P-5705BA, P-5705BB****ST-28****Mecklenburg County**

See second page of form for submittal instructions.

4. Electronic copy of submittal is required. See referenced provision.

**CRANE SAFETY****(8-15-05)**

Comply with the manufacturer specifications and limitations applicable to the operation of any and all cranes and derricks. Prime contractors, sub-contractors, and fully operated rental companies shall comply with the current Occupational Safety and Health Administration regulations (OSHA) and the Construction Procedures identified in Appendix A.

Submit all items listed below to the Engineer prior to beginning crane operations involving critical lifts. A critical lift is defined as any lift that exceeds 75 percent of the manufacturer's crane chart capacity for the radius at which the load will be lifted or requires the use of more than one crane, and/or a lift identified in the contractor work plans section of the project special provisions. Changes in personnel or equipment must be reported to the Engineer and all applicable items listed below must be updated and submitted prior to continuing with crane operations.

**CRANE SAFETY SUBMITTAL LIST**

- A. **Competent Person:** Provide the name and qualifications of the "Competent Person" responsible for crane safety and lifting operations. The named competent person will have the responsibility and authority to stop any work activity due to safety concerns.
- B. **Riggers:** Provide the qualifications and experience of the persons responsible for rigging operations. Qualifications and experience should include, but not be limited to, weight calculations, center of gravity determinations, selection and inspection of sling and rigging equipment, and safe rigging practices.
- C. **Crane Inspections:** Inspection records for all cranes shall be current and readily accessible for review upon request.
- D. **Certifications:** **By July 1, 2006**, crane operators performing critical lifts shall be certified by NC CCO (National Commission for the Certification of Crane Operators), or satisfactorily complete the Carolinas AGC's Professional Crane Operator's Proficiency Program. Other approved nationally accredited programs will be considered upon request. All crane operators shall also have a current CDL medical card. Submit a list of anticipated critical lifts and corresponding crane operator(s). Include current certification for the type of crane operated (small hydraulic, large hydraulic, small lattice, large lattice) and medical evaluations for each operator.

**Projects P-5705BA, P-5705BB****ST-29****Mecklenburg County****GROUT FOR STRUCTURES****9-30-11****1.0 DESCRIPTION**

This special provision addresses grout for use in pile blockouts, grout pockets, shear keys, dowel holes and recesses for structures. This provision does not apply to grout placed in post-tensioning ducts for bridge beams, girders, decks, end bent caps or bent caps. Mix and place grout in accordance with the manufacturer's recommendations, the applicable sections of the Standard Specifications and this provision.

**2.0 MATERIAL REQUIREMENTS**

Unless otherwise noted on the plans, use a Type 3 Grout in accordance with Section 1003 of the Standard Specifications. Certification shall be supplied, for review by the Railroad, attesting that the product furnished is in accordance.

Initial setting time shall not be less than 10 minutes when tested in accordance with ASTM C266.

Construction loading and traffic loading shall not be allowed until the 3 day compressive strength is achieved.

**3.0 SAMPLING AND PLACEMENT**

Place and maintain components in final position until grout placement is complete and accepted. Concrete surfaces to receive grout shall be free of defective concrete, laitance, oil, grease and other foreign matter. Saturate concrete surfaces with clean water and remove excess water prior to placing grout.

**4.0 BASIS OF PAYMENT**

No separate payment will be made for "Grout for Structures". The cost of the material, equipment, labor, placement, and any incidentals necessary to complete the work shall be considered incidental to the structure item requiring grout.

Projects P-5705BA, P-5705BB

**ST-30**

Mecklenburg County

**ASBESTOS ASSESSMENT FOR BRIDGE DEMOLITION AND RENOVATION ACTIVITIES****(12-30-15)****1.0 INSPECTION FOR ASBESTOS CONTAINING MATERIAL**

Prior to conducting bridge demolition or renovation activities, the Contractor shall thoroughly inspect the bridge or affected components for the presence of asbestos containing material (ACM) using a firm prequalified by NCDOT to perform asbestos surveys. The inspection must be performed by a N.C. accredited asbestos inspector with experience inspecting bridges or other industrial structures. The N.C. accredited asbestos inspector must conduct a thorough inspection, identifying all asbestos-containing material as required by the Environmental Protection Agency National Emission Standards for Hazardous Air Pollutants (NESHAP) Code of Federal Regulations (CFR) 40 CFR, Part 61, Subpart M.

The Contractor shall submit proposed testing and abatement protocols for review prior to inspection. The Contractor shall submit an inspection report to the Engineer, which at a minimum must include information required in 40 CFR 763.85 (a)(4) vi)(A)-(E), as well as a project location map, photos of existing structure, the date of inspection and the name, N.C. accreditation number, and signature of the N.C. accredited asbestos inspector who performed the inspection and completed the report. The cover sheet of the report shall include project identification information. Place the following notes on the cover sheet of the report and check the appropriate box:

- ACM was found  
 ACM was not found

**2.0 REMOVAL AND DISPOSAL OF ASBESTOS CONTAINING MATERIAL**

If ACM is found, notify the Engineer. Compensation for removal and disposal of ACM is considered extra work in accordance with Article 104-7 of the Standard Specifications.

An Asbestos Removal Permit must be obtained from the Health Hazards Control Unit (HHCU) of the N.C. Department of Health & Human Services, Division of Public Health, if more than 35 cubic feet, 160 square feet, or 260 linear feet of regulated ACM (RACM) is to be removed from a structure and this work must be completed by a contractor prequalified by NCDOT to perform asbestos abatement. RACM is defined in 40 CFR, Part 61, Subpart M. Note: 40 CFR 763.85 (a)(4) vi)(D) defines ACM as surfacing, TSI and Miscellaneous which does not meet the NESHAP RACM.

**3.0 DEMOLITION NOTIFICATION**

Even if no ACM is found (or if quantities are less than those required for a permit), a Demolition Notification (DHHS-3768) must be submitted to the HHCU. Notifications and Asbestos Permit applications require an original signature and must be submitted to the HHCU 10 working days prior to beginning demolition activities. The 10 working day period starts based on the post-marked date or date of hand delivery. Demolition that does not begin as originally notified requires submission of a separate revision form HHCU 3768-R to

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HHCUC. Reference the North Carolina Administrative Code, Chapter 10A, Subchapter 41C, Article .0605 for directives on revision submissions.

Contact Information

Health Hazards Control Unit (HHCUC)  
N.C. Department of Health and Human Services  
1912 Mail Service Center  
Raleigh, NC 27699-1912  
Telephone: (919) 707-5950  
Fax: (919) 870-4808

**4.0 SPECIAL CONSIDERATIONS**

Buncombe, Forsyth, and Mecklenburg counties also have asbestos permitting and NESHAP requirements must be followed. For projects involving permitted RACM removals, both the applicable county and the state (HHCUC) must be notified.

For demolitions with no RACM, only the local environmental agencies must be notified. Contact information is as follows:

Buncombe County

WNC Regional Air Pollution Control Agency  
49 Mt. Carmel Road  
Asheville, NC 28806  
(828) 250-6777

Forsyth County

Environmental Affairs Department  
537 N. Spruce Street  
Winston-Salem, NC 27101  
(336) 703-2440

Mecklenburg County

Land Use and Environmental Services Agency  
Mecklenburg Air Quality  
700 N. Tryon Street  
Charlotte, NC 28202  
(704) 336-5430

**5.0 ADDITIONAL INFORMATION**

Additional information may be found on N.C. asbestos rules, regulations, procedures and N.C. accredited inspectors, as well as associated forms for demolition notifications and asbestos permit applications at the N.C. Asbestos Hazard Management Program website:

[www.epi.state.nc.us/epi/asbestos/ahmp.html](http://www.epi.state.nc.us/epi/asbestos/ahmp.html)

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**Mecklenburg County**

**6.0 BASIS OF PAYMENT**

Payment for the work required in this provision will be at the lump sum contract unit price for “Asbestos Assessment”. Such payment will be full compensation for all asbestos inspections, reports, permitting and notifications.

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**ST-33**

Mecklenburg County

**TURN-OF-NUT TIGHTENING****(6-22-16)**

The 2018 Standard Specifications shall be revised as follows:

Add the following to the end of **Section 440-8 – Connections Using High Strength Bolts:**

**(E) Installation Using Turn-of-Nut Tightening**

When using the turn-of-nut method to provide the required bolt tension, first provide enough bolts in a “snug tight” condition to bring the parts of the joint into full contact with each other. Snug tight is defined as the tightness attained by a few impacts of an impact wrench or the full effort of a man using an ordinary spud wrench. Following this initial operation, place bolts in any remaining holes in the connection and bring to snug tightness. After bringing all bolts in a connection to snug tightness, match mark each nut, bolt shank, and the structural base metal with a line of white ink or paint that is not water soluble. Additionally, mark the structural base metal to indicate that applicable amount of nut rotation specified in Table 440-3. Tighten all bolts in the joint additionally by the applicable amount of nut rotation specified in Table 440-3, progressing systematically from the most rigid part of the joint to its free edges. During this operation do not allow rotation of the part not turned by the wrench. To ensure compliance with this article, keep the match mark on the bolt shank and the initial mark on the structural base metal aligned. Additionally, tighten to align the match mark on the nut and the mark representing the specified amount of nut rotation.

**TABLE 440-3**  
**NUT ROTATION <sup>a</sup> FROM SNUG TIGHT CONDITION**

Bolt Length As Measured from Underside of Head to Extreme End of Point	Disposition of Outer Faces of Bolted Parts		
	Both faces normal to bolt axis	One face normal to bolt axis and other face sloped not more than 1:20 (bevel washer not used)	Both faces sloped not more than 1:20 from normal to bolt axis (bevel washers not used)
Up to and including 4 diameters	1/3 turn	1/2 turn	2/3 turn
Over 4 diameters but not exceeding 8 diameters	1/2 turn	2/3 turn	5/6 turn
Over 8 diameters but not exceeding 12 diameters <sup>b</sup>	2/3 turn	5/6 turn	1 turn



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- a. Applicable to coarse thread heavy hex structural bolts of all sizes and lengths up to 12 diameters, and heavy hex semi-finished nuts. Nut rotation is relative to the bolt, regardless of the element (nut or bolt) being turned. For bolts installed by 1/2 turn and less, the tolerance should be plus or minus 30 degrees; for bolts installed by 2/3 turn and more, the tolerance should be plus or minus 45 degrees.
- b. When bolt lengths exceed 12 diameters, the required rotation shall be determined by actual tests in a suitable tension device simulating the actual conditions.

**(F) Inspection of Turn-of-Nut Tightening**

Allow the Engineer the opportunity to observe installation of bolts to determine that the selected tightening procedure is properly used and the bolts are properly tightened. Where the turn-of-nut method is used, each bolt is inspected visually for the correct relationship between the match marks on the nut and bolt shank. Bolts installed by the turn-of-nut method may reach tensions above the value given in Table 440-1 but this is not a cause for rejection. After properly tightening bolts, make sure that the end of the bolt is flush with or extended beyond the outer face of the nut.

Do not begin painting in the area of tightened bolts until after bolt inspection is complete.

In addition to inspecting the match mark relationship with the turn-of-nut method, use the following inspection procedure unless the contract requires a more extensive or different inspection procedure.

As directed, furnish and use, in the presence of the Engineer, or allow the Engineer to use an inspection torque wrench, calibrated as follows:

At least once each working day, place 3 calibration sample bolts of the same grade, size, representative length, and conditions as those under inspection in a tension indicating calibration device. Furnish a tension indicating calibration device certified by an approved independent testing lab within 6 calendar months prior to testing the bolts under inspection, to be in good working order and to provide accuracy within plus or minus 10 percent for the range of loads between 25,000 and 40,000 pounds. Place a washer under the part turned in tightening for each bolt if washers are so used in the structure. If no washer is used make sure that the material abutting the part turned is the same as that used in the structure.

Tighten each calibration sample bolt in the calibration device by any convenient means to an initial condition equal to 15 percent of the required tension and then to the minimum tension specified in Table 440-1. Then apply the inspecting wrench to the tightened bolt and determine the torque necessary to turn the nut or head 5 degrees (approximately 1" at 12" radius) in the tightening direction. Use the average torque measured in the tests of 3 bolts as the job inspecting torque.

Use the inspection wrench to inspect bolts, represented by the calibration sample bolts, which are tightened in the structure by applying in the tightening direction the job inspecting torque to 10 percent of the bolts, but not less than 2 bolts,

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selected at random in each connection. If no nut or bolt head turns by this application of the job inspecting torque, the connection is acceptable as properly tightened. If any nut or bolt head turns by the application of the job inspecting torque, apply this torque to all bolts in the connection. Tighten and reinspect all bolts whose nut or head turns by the job inspecting torque. Alternatively, retighten all the bolts in the connection and resubmit the connection for the specified inspection.

**COLUMN EXCAVATION****(SPECIAL)****1.0 GENERAL**

Column Excavation is required at Pier 1 and Pier 2 of Structure at Station 15+39.55 -S1- and Pier 1 and Pier 2 of Structure at Station 42+59.46 -A1- in order to construct columns from top of drilled pier to bottom of cap.

**2.0 CONSTRUCTION METHODS**

Install the temporary column casing from ground line to top of drilled pier elevation. Provide temporary column casing with a minimum diameter of 6in greater than the largest casing used for drilled pier construction. Excavate the soil inside of the temporary column casing. After the column construction is complete, protect the column and backfill the excavation with clean sand. Remove the temporary column casing.

**3.0 BASIS OF PAYMENT**

Payment for column excavation shall be included in the unit contract price for “\_\_\_\_ Dia. Drilled Piers in Soil”. Payment will include, but is not limited to, furnishing all labor, tools, equipment, materials, excavation and backfilling. Column shall be paid for separately.

**WATERPROOFING****(SPECIAL)**

Waterproof the top surface of the bridge deck and all construction joints which will be covered by fill with a cold liquid-applied elastomeric membrane to the limits shown in the contract plans. Waterproofing membrane shall be a two coat, rapid cure, seamless, cold liquid spray applied membrane such as the “Eliminator” system manufactured by Stirling Lloyd Products, Inc., or the “Bridge Deck Membrane” system manufactured by Bridge Preservation L.L.C. (R.J. Watson, Inc.) or approved equal. Apply waterproofing in strict accordance with manufacturer’s recommendations. Immediately prior to application of membrane, clean the surfaces to be waterproofed per the manufacturer’s recommendations. Membrane protection is not required, i.e. ballast may be placed directly on top of the fully cured membrane waterproofing.

The entire cost of the waterproofing complete in place will be paid for at the contract unit price per square yard for “Waterproofing”.

**Projects P-5705BA, P-5705BB****ST-36****Mecklenburg County****PORTLAND CEMENT****(SPECIAL)**

Portland Cement shall meet the requirements of the Standard Specifications for the type specified for the work. In addition, in order to minimize alkali content, the total percentage of sodium oxide (Na<sub>2</sub>O) present plus 0.658 times the total percentage of potassium oxide (K<sub>2</sub>O) present shall not exceed 0.60 percent. The Contractor shall furnish the Engineer with two (2) copies of certified mill test reports from the manufacturer stating that all cement meets the above requirements.

Flyash may be substituted for cement in the amounts shown in Section 1024-1 of the Standard Specifications provided that the minimum cement requirement as shown on the Plans has been satisfied. In no case shall the substitution of flyash or other admixtures approved by the Engineer be in lieu of the minimum cement requirements.

**FINE AND COARSE AGGREGATE****(SPECIAL)**

The fine and coarse aggregates used in all concrete on the railway structure shall be non-reactive in accordance with the "Method of Test for Potential Reactivity of Aggregates (Chemical Method)", ASTM Designation C289-81. The Contractor shall furnish the Engineer two (2) copies of the above test reports certifying that the fine and coarse aggregates are non-reactive and will not cause an alkali reaction.

**WATERSTOPS****(SPECIAL)**

Waterstops shall be made of an approved flexible polyvinyl-chloride plastic conforming to U.S. Corps of Engineers Specification CRD-C-572-74 or rubber conforming to U.S. Corps of Engineers Specification CRD-C-513-75. Waterstops shall be made in the shape and of the material specified on the Plans. Product data to be submitted for approval. The material shall form a continuous waterstop across the slab and up the parapets of bridge decks, abutment wings, or other locations as shown on the Plans. Waterstops shall be fabricated in continuous units without splices, using material of the longest length available. Where bonded joints are necessary, like materials shall be bonded together by experienced persons in accordance with the manufacturer's instructions. The entire cost of the waterstop complete in place shall be included in the unit contract price bid for "Reinforced Concrete Deck Slab."

**ELASTOMERIC FLASHING****(SPECIAL)**

The elastomeric flashing at the expansion joint between deck slabs shall be a continuous sheet of synthetic rubber 1/16" thick by 10" wide or equal based on polychloroprene having properties specified by the following test data:

Tensile Strength, ASTM D-412-80	2,000 psi minimum
Elongation, ASTM D-412-80	300% minimum

**Projects P-5705BA, P-5705BB****ST-37****Mecklenburg County**

Hardness, ASTM D-2240-81

60 ± 10

Water Absorption, ASTM D-471-79

10% maximum

The adhesive for use with the flashing shall be as recommended by the manufacturer of the synthetic rubber furnished and shall be applied according to the manufacturer's instructions. Product data to be submitted for approval.

The entire cost of the elastomeric flashing, complete in place, shall be included in the unit contract price bid for "Reinforced Concrete Deck Slab."

**RUBBER JOINT COMPOUNDS****(SPECIAL)**

Expansion joints shall be sealed with a two component elastomeric polymer type cold-applied synthetic joint sealer, manufactured with Thiokol polysulfide liquid polymers. The material shall be grey polysulfide rubber base caulking compound conforming to Specification ANSI A-116.1. Product data to be submitted for approval. Pouring type compound shall be used for horizontal joints and non-sag type for other joints. The mixing and application of the joint sealing compound shall be performed with the equipment recommended and in strict accordance with the manufacturer's instructions. The entire cost of rubber joint compounds shall be included in the unit contract price bid for "Reinforced Concrete Deck Slab."

**STRUCTURE DRAINAGE SYSTEM****(SPECIAL)****Materials**

Ductile iron pipe (D.I.P) drains shall be as detailed and specified on the Plans. Perforated pipe drains behind the abutments shall be corrugated steel pipe as detailed on the Plans. French drain material behind abutments shall be No. 467M crushed stone or gravel conforming to Table 1005-1, Aggregate Gradation.

**Installation**

Deck drains shall be located as shown on the Plans. The D.I.P. drains shall be installed as detailed and specified on the Plans.

Perforated pipe drains behind the abutments shall be laid with perforations turned down and bedded on a layer of compacted impervious clay. The perforations shall be kept open and free from the clay bedding course, asphalt coating, or other material. The French drain material shall be placed concurrently with the backfill and shall be kept separate with a thin timber slide or burlap bag. Perforated pipe behind abutments and outfall pipes shall be laid on a grade of at least one percent (1%) and shall be located as shown on the Plans.

Grades of pipe drains shall be set by the Engineer. Copies of shop drawings showing details of the drainage system, including gaskets and joint materials, shall be submitted by the Contractor to the Engineer for approval. The drainage system must be approved prior to fabrication.

**Projects P-5705BA, P-5705BB****ST-38****Mecklenburg County**Basis of Payment

Payment for the Structure Drainage System will be made at the contract lump sum price bid for "Structure Drainage System at Sta. \_\_\_\_\_". Such lump sum price shall be full compensation for furnishing all materials and labor to install the drainage system complete, including ductile iron pipe, deck drains, fittings, excavation, perforated pipe drains, French drain material, other backfill and outfall pipes.

**BACKFILLING AROUND STRUCTURES****(SPECIAL)**

Backfill material behind abutments (except No. 467M crushed stone or gravel for French drains over perforated drain pipes) shall be Type A Aggregate Base Course (ABC) in accordance with the Standard Specifications. Placing and compacting shall be as provided for in Section 410-8 of the Standard Specifications. Reference both the plans and specifications for dimensions of ABC backfill behind the abutments.

Backfill around structures, except as specified above, shall be suitable material available from the excavations. In the event material excavated is not approved for use as backfill by the Engineer, the Contractor will be required to furnish and haul to the structure site the necessary suitable backfill material. Placing and compacting shall be as provided in Section 410-8 of the Standard Specifications.

Disposal of surplus excavated material shall be as specified in Section 410-1 of the Standard Specifications.

Payment for furnishing ABC backfill material and any suitable material to replace excavated material and for placing and compacting all backfill material shall be included in the contract lump sum price for the associated Structure Drainage System pay item.

The Contractor shall submit to the Engineer, for approval prior to installation, any dimensions of ABC backfill that differ from the dimensions shown in the structure plans. Additionally, the Contractor shall submit for approval by the Engineer and NSR any similar but non-compliant ABC materials.

**SELF-LUBRICATING EXPANSION BEARING ASSEMBLIES****(SPECIAL)**Description

The self-lubricating expansion bearing assemblies each consist of an oil-less self-lubricating copper alloy plate, a sole plate, a sliding plate with keeper bars, a masonry plate, any necessary fill plates, a bearing pad, an anchor bolt assembly which includes anchor bolts, nuts, and washers, pipe sleeves, a closure plate, grout, various sizes of standard pipe, and any other necessary material as detailed on the Plans. These bearing assemblies are located at the expansion ends of applicable spans as shown on the Plans.

Requirements**Structure Special Provisions****April 2018**

**Projects P-5705BA, P-5705BB****ST-39****Mecklenburg County**

Use self-lubricating copper alloy bearing plates that are an approved article of standard production by an established manufacturer of such equipment installed in accordance with the manufacturer's recommendations and conforming to the following requirements:

- Copper alloy conforming to AASHTO M107 Alloy 911 or AASHTO M108 Alloy 510.
- Lubricant of the solid type and consisting of graphite, metallic substances having lubricating properties and a lubricating binder. Do not use materials without lubricating qualities or that promote chemical or electrolytic reactions. Use lubricant that is integrally molded and compressed into the lubrication recesses to form a dense, non-plastic lubricant.
- Recesses arranged in a geometric pattern so that successive rows overlap in the direction of motion and the distance between extremities of recesses is closer in the direction of motion than that perpendicular to motion. Lubricate the entire bearing area of all surfaces that have provision for motion by means of these lubricant filled recesses. Provide a total area of these recesses between 25% and 35% of the total bearing area of the plate.
- Furnish bearing plates in sizes specified on the drawings. Machine finish the bearing surfaces and make sure that the surface roughness does not exceed 125 micro inches (3.18 microns) when measured in accordance with ASA Standard B46.1-1955. Also finish the bearing surfaces of the opposing steel plates as above. Align the tool marks in the direction of motion. Finish the bearing surfaces so that all machine surfaces are flat within 0.0005 inch per inch of length and width.
- For mating curved surfaces of steel and copper alloy, the maximum positive tolerance for the concave surface is 0.010 inch and the maximum negative tolerance for the convex surface is 0.010 inch.
- The coefficient of friction between the copper alloy self-lubricating plates and the steel plates in contact with them does not exceed 0.10 when subjected to the designed unit loading and at twice the designed unit loading.

**Basis of Payment**

Payment for the bearing assemblies will be at the contract lump sum price bid for "Self-lubricating Expansion Bearing Assemblies." Such lump sum price will be full compensation for all materials, tools, equipment, labor and incidentals necessary to furnish and install the self-lubricating bearing assemblies.

Payment for the Fixed Bearing Assemblies as shown on the Plans will be included in the lump sum price bid for "Approx. \_\_\_\_\_ Lbs. Structural Steel".

**Projects P-5705BA, P-5705BB****ST-40****Mecklenburg County****CONDUIT IN PARAPETS****(SPECIAL)**

Conduit in the parapets shall be 4” diameter PVC conduit conforming to applicable Underwriters Laboratory specifications and shall be located as shown on the Plans. Provisions shall be made for expansion between the deck slab and abutment backwalls and between deck slabs at expansion joints. Couplings shall be provided behind backwalls for connection to the 4” diameter rigid pipe. If non-PVC fittings, couplings, or other incidental items are required, they must be fully compatible with PVC conduit. Details and material data shall be submitted by the Contractor to the Engineer for approval by the Railway Company of all materials required for this work. The entire cost of furnishing and installing all conduit, expansion fittings, couplings and incidental items required for this work shall be included in the unit contract price bid for “Concrete Parapet”.

**CONCRETE PARAPET****(SPECIAL)**

Concrete Parapet shall be as shown on the plans and shall comply with Section 460 of the Standard Specifications. See plans for expansion and contraction joint spacing requirements. The quantity of concrete parapet to be paid for will be measured and paid as the number of linear feet of concrete parapet provided in the plans. Full compensation for the work shall include, but is not limited to, falsework and formwork, concrete, reinforcing steel, admixtures, all other materials and placing, finishing and curing the concrete. The quantity of concrete parapet as measured above will be paid for at the contract unit price per linear foot for “Concrete Parapet”.

**METAL RAIL (ALUMINUM)****(SPECIAL)**

The Metal Handrail shall be as shown on the Plans. The quantity of handrail to be paid for will be the actual number of linear feet of handrail measured continuously along the top bar of the rail from end to end which has been completed and accepted. Full compensation for the work shall include, but is not limited to, furnishing posts, rails, fittings and all other materials and fabricating and erecting the metal rail. The quantity of metal rail as measured above will be paid for at the contract unit price per linear foot for “Metal Rail (Aluminum)”.

**METAL RAIL (STEEL) AND FENCE****(SPECIAL)**

The Metal Handrail and Fence shall be as shown on the Plans. The quantity of handrail and fence to be paid for will be the actual number of linear feet of handrail and fence measured continuously along the top rail from end to end which has been completed and accepted. Full compensation for the work shall include, but is not limited to, furnishing posts, rails, fence, fittings and all other materials and fabricating and erecting the metal rail. The quantity of metal rail and fence as measured above will be paid for at the contract unit price per linear foot for “Metal Rail (Steel) and Fence”.

**Projects P-5705BA, P-5705BB****ST-41****Mecklenburg County****STRUCTURAL STEEL****(SPECIAL)****1. SCOPE**

- A. This special provision shall cover the furnishing, fabrication, preparation, assembly, welding, painting, and erection of all structural steel shown on the plans.

**2. GENERAL SPECIFICATIONS**

- A. Except as otherwise specified hereinafter, the current AREMA Specifications, Chapter 15, Steel Structures, apply to all work.

**3. STRUCTURAL STEEL****A. Fracture Critical Members**

1. All fracture critical members are identified on the plans.
2. All fracture critical members will be fabricated in accordance with the Fracture Control Plan stated in the AREMA Specifications, Chapter 15, Section 1.14.
3. Fabricator shall be certified under the AISC Quality Certification Program as follows:
  - a. For Welded Plate Girders: Major Steel Bridge Category
  - b. For Rolled Beam Bridges: Simple Steel Bridge Structures Category
4. Except as noted in the AREMA Fracture Control Plan, structural steel shall meet the current requirements of the ASTM Specifications for Structural Steel, Designation A-709, Grade 50 and the following supplementary requirements:
  - a. S5-F2 (Fracture Critical - Charpy Test Zone 2)
  - b. S29 (Fine Austenitic Grain Size)
  - c. S93 (Limitation on Weld Repairs)

**B. Non-Fracture Critical Members**

1. All primary members or components requiring improved notch toughness are identified on the plans.
2. Fabricator shall be certified under the AISC Quality Certification Program as follows:



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- a. For Welded Plate Girders: Major Steel Bridge Category
  - b. For Rolled Beam Bridges: Simple Steel Bridge Structures Category
3. Structural steel shapes and plates used as primary members or components shall meet the current requirements of the ASTM Specifications for Structural Steel, Designation A-709, Grade 50 and the following supplementary requirements:
- a. S5-T2 (Non-Fracture Critical - Charpy Test Zone 2)
  - b. S29 (Fine Austenitic Grain Size)

**C. Other Structural Steel**

1. The Fabricator shall be certified under the AISC Quality Certification Program, Simple Steel Bridge Structures Category.
2. All structural steel shapes shall meet the current requirements of the ASTM Specifications for Structural Steel, Designation A-709, Grade 50, unless specified otherwise in this special provision or on the plans.
3. All Steel plate shall meet the current requirements of A572, Grade 50.

**4. OTHER MATERIALS**

- A. High strength bolts shall meet the current requirements of the ASTM Specifications for High Strength Bolts for Structural Steel Joints, Designation A325.
- B. Anchor rods shall be threaded rods with heavy hex nut meeting the current requirements of ASTM specification for fasteners, Designation A-449.
- C. Welding electrodes for arc welding shall meet the current requirements of the Specifications for mild steel arc-welding electrodes Series E70, AWS 5.1, Low Hydrogen Classification for SMAW and AWS 5.17 for SAW.
- D. Preformed fabric bearing pads shall be Shock Pad Style No. 15175 as manufactured by Alert Manufacturing and Supply Company, Chicago, Illinois, or FABREEKA Pads as manufactured by Fabreeka Products Company, 1190 Adams Street, Boston, Massachusetts, or SORBTEX Pads as manufactured by Voss Engineering, Inc., Chicago, Illinois, or approved equal.

**5. WELDING PROCESSES**

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- A. Submerged arc welding (SAW) or shielded metal arc welding (SMAW) may be used for girder (flange to web) fabrication.

**6. BOLTED CONNECTIONS**

- A. Permanent bolted connections using High Strength Bolts shall be installed and tightened using the Turn-of-the-Nut Method.
- B. Tension Control Bolts are not permitted.

**7. PAINT**

- A. All steel preparation and painting shall be in accordance with the special provision "Painting Structural Steel".

**8. SHOP DRAWINGS**

- A. The Contractor's attention is called to the requirements for shop drawings, Chapter 15, Part 1 Article 1.1.3 Shop Drawings, AREMA Specifications.
- B. The Contractor shall furnish an electronic set in PDF format of detailed shop drawings to the Engineer (NCDOT) for review and approval by the Railroad prior to starting fabrication. Unchecked drawings shall not be submitted for approval. After approval of shop drawings, the Contractor shall supply the Railroad with one electronic set of the approved fabrication drawings.
- C. The rejection of or the procedure for the correction of shop drawings will not be considered as cause for delay.
- D. Approval by the Engineer of the shop drawings shall not relieve the Contractor from furnishing material of proper dimensions, quantity, and quality, nor will such approval relieve the Contractor from the responsibility for errors of any sort in the shop drawings.
- E. Original drawings in PDF format shall be furnished at the completion of the Contract in accordance with Chapter 15, Article 1.1.3, AREMA specifications.

**9. SHOP INSPECTION & TESTING**

- A. The Railroad may arrange for inspection by an independent inspection firm under a separate contract. This inspection will be in addition to the Fabricator's Quality Control Program.
- B. The Fabricator shall notify the Railroad and its inspector, through the Engineer, of the scheduled date for beginning fabrication and shall not begin fabrication until the Railroad's Inspector is present.

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- C. The Fabricator shall furnish copies of certified mill inspection reports to the Engineer (NCDOT) for review and approval by the Railroad for all structural steel requiring improved notch toughness.
- D. The Fabricator shall meet the requirements of the AREMA Fracture Control Plan described in Chapter 15, Part 1, Article 1.14 for all members and components designated as fracture critical.
- E. Welding Inspection shall verify that all welds and welding procedures meet the requirements of the current American Welding Society (A.W.S.) Bridge Welding Code, D1.5.
- F. All welds shall be inspected visually and by use of nondestructive testing. All nondestructive testing shall be performed by the Fabricator and witnessed by the Railroad's Inspector. The Contractor shall coordinate inspections through the Engineer.
- G. Witnessing of weld inspection shall be done in a timely manner without disruption of normal shop operations. Copies of all weld inspections and nondestructive testing reports shall be furnished to the Engineer (NCDOT) for review and approval by the Railroad.
- H. The Fabricator shall perform the following weld inspection and testing:
  - 1. All transverse tension groove welds in FCM members, when allowed by the Engineer, shall be RT and UT tested 100%. In non-FCM components of FCM's all transverse groove welds shall be RT or UT tested 100%.
  - 2. All flange to web welds shall be tested on both sides in accordance with American Welding Society (A.W.S.) Bridge Welding Code, D1.5/2013, Clause 6.7.
  - 3. All flange to web fillet welds, when allowed by the Engineer, are to be magnetic particle tested 100%.
  - 4. Ten percent (10%) of all welds not mentioned above shall be magnetic particle tested.

#### 10. MEASUREMENT AND PAYMENT

Payment will be made at the contract lump sum price for the bid item "Approx. \_\_\_\_\_ Lbs. Structural Steel" and shall constitute full payment for all costs of plant, superintendent, labor, material, and equipment necessary to furnish, fabricate, shop paint, and shop assemble and deliver all the structural steel required for the

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project in accordance with the Plans, Specifications, and Special Provisions, including furnishing the fabric bearing pads, the fixed bearing assemblies and anchor bolts.

**Projects P-5705BA, P-5705BB****ST-46****Mecklenburg County****PAINING STRUCTURAL STEEL****(SPECIAL)****1. GENERAL****A. Plans and Specifications**

1. This work consists of furnishing all labor, material, plant and equipment, and performing all operations in connection with Shop Painting (prime coat, wash coat, and Finish coat applied in the fabricators plant or unless otherwise specified by the Railway). All painting shall be in accordance with AREMA Specifications, Chapter 15 - Section 3.4, and Society of Protective Coatings Specifications with the following specific requirements.
2. The paint thickness will be measured according to "SSPC-PA2" Method for Measurement of Dry Paint Thickness with Magnetic Gages.
3. In addition to the requirements specified herein, all structural steel shall receive a stripe coat paint per the Standard Specifications.

**B. Surface Preparation**

1. The surface preparation shall be in accordance with Society of Protective Coatings Specifications SP 10 (NEAR WHITE BLAST) latest revision and Visual Standard NACE No. 2. Average surface profile to be 2 mils.
2. Application - The paint shall be applied in accordance with SSPC Specifications for Paint Application - PA1.
3. The Prime Coat shall be applied in the shop promptly after blast cleaning, but in no case shall the prime coat be applied more than 8 hours after blast cleaning or after visible or detrimental rusting occurs.
4. Steel shall be cleaned by washing, or other mechanical means to remove all residue (loose zinc dust and foreign matter) prior to applying Wash and Finish Coat.
5. Surfaces damaged during shipment and handling shall be repaired using the same paint system as applied in the shop except that the Prime coat shall be repaired using an Organic Zinc Primer when the Primer Coat is repaired in the field.

**C. Welded Areas and Faying (Contact) Surfaces**

1. No paint shall be applied to areas to be welded in the field. No Vinyl

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paint (wash or Finish coat) shall be applied to any faying surfaces.

## 2. PAINTING REQUIREMENTS

### A. Paint System

1. The fabricator will be given the option of using one of the following paint systems (Prime Coat, Intermediate and Finish Coats shall be applied in the fabricator's plant unless otherwise specified by the Engineer). If the Intermediate Coat and Finish Coat are applied in the field, the steel shall be solvent wiped to remove all grease and oil and a "High Pressure Power Washing" with clean water (3500 psi minimum) shall be used to clean all mud and dirt off prior to applying the touch-up Primer or Intermediate and Finish Coats. The fabricator shall supply sufficient quantities of touch-up Organic Zinc-Rich Primer, Intermediate Coat, Finish Coat and Thinner. The Engineer (NCDOT) shall be notified of the fabricator's choice for railway review. Priming of the contact surfaces with Inorganic Zinc-Rich primer is required.
2. If approved or further specified by the Engineer (NCDOT) per review by railway, the Wash Coat and Finish Coat shall be applied in the shop. Intermediate Coat color shall be White and Stripe Coat color shall be Light Gray. Top Coat color shall be Light Gray, Paint Code: 26306 (Federal Standard 595B).

### B. Approved Paint Systems

1. System #1 (ELITE)
  - a. Prime Coat: Elite 1312 Inorganic Zinc Rich Primer applied at 4.0 - 5.0 mils Dry Film Thickness.
  - b. Intermediate Coat - Elite 156 Exterior Acrylic Latex (White) applied at 3.0 - 4.0 mils Dry Film Thickness.
  - c. Finish Coat - Elite 156 Exterior Acrylic Latex (Gray) applied at 3.0 - 4.0 mils Dry Film Thickness.
  - d. Touch Up Primer - Elite 305 Organic Zinc-Rich Primer applied at 4.0 - 5.0 mils Dry Film Thickness.
  - e. Suggested Supplier:  
Elite Coatings Company,  
Inc.  
P.O. Box 130

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Gordon, GA 31031  
Telephone: (912) 628-  
2111

2. System #2 (DEVOE)

- a. Prime Coat: Catha-Coat 302HB Reinforced Inorganic Zinc-Rich Primer applied at 3.0 - 4.0 mils Dry Film Thickness.
- b. Intermediate Coat: Bar-Rust 235 Multi-Purpose Epoxy Coating (White) applied at 4.0 - 8.0 mils Dry Film Thickness.
- c. Finish Coat: Devthane 379UVA Aliphatic Urethane Gloss Enamel (Gray) applied at 2.0 - 3.0 mils Dry Film Thickness.
- d. Touch Up Primer - Catha-Coat 302HB Reinforced Inorganic Zinc-Rich Primer applied at 3.0 - 4.0 mils Dry Film Thickness.
- e. Suggested Supplier:

Devoe Coatings Company  
320 Westbrook Drive  
Butler, PA 16001  
Telephone: (724) 283-1471

3. System #3 (SHERWIN-WILLIAMS)

- a. Prime Coat: ZINC CLAD II Plus - (B69VZ1 B69VZ13 B69D11) Inorganic Zinc-Rich Primer applied at 2.0 - 4.0 mils Dry Film Thickness.
- b. Intermediate Coat - B66 Series DTM ACRYLIC GLOSS (White) applied at 3.0 - 4.0 mils Dry Film Thickness.
- c. Finish Coat - B66 Series DTM ACRYLIC GLOSS (Gray) applied at 3.0 - 4.0 mils Dry Film Thickness.
- d. Touch Up Primer - ZINC-CLAD IV - (B69 A8/B69 V8) applied at 4.0 - 5.0 mils Dry Film Thickness.
- e. Suggested Supplier:

The Sherwin-Williams  
Company  
765 North Avenue, NE  
Atlanta, GA 30306  
Telephone: (404) 873-6723

4. System #4 (AMERON)

- a. Prime Coat: Amercoat 21-5 Inorganic Zinc-Rich primer applied at 4.0 - 5.0 mils Dry Film Thickness.
- b. Intermediate Coat - Amercoat 148 Waterborne Acrylic primer applied at 3.0 - 4.0 mils Dry Film Thickness.
- c. Finish Coat - Amercoat 220 Waterborne Acrylic (Gray) applied at 3.0 - 4.0 mils Dry Film Thickness.
- d. Touch Up Primer - Amercoat 68HS Zinc-Rich Primer applied at 4.0 - 5.0 mils Dry Film Thickness.
- e. Suggested Supplier:

Ameron Protective Coatings Division  
11605 Vimy Ridge Road  
Little Rock, AR 72209  
Telephone: (800) 283-6627

C. Post Painting Requirements

- 1. Steel shall be cleaned by washing, or other mechanical means to remove all residue (loose zinc dust and foreign matter) prior to applying Wash and Finish Coat. An "M.E.K. Rub Test" shall be used to assure proper cure of the inorganic zinc primer prior to applying the next coat.
- 2. The Intermediate Coat may have to be thinned to prevent gassing.

3. PAINTING MATERIALS REQUIREMENTS

A. Packaging and Shipping

- 1. All paint shall be received at the point of use in original containers and carefully stored. All paint to be used shall be freshly mixed and shall be ordered only a sufficient length of time in advance of its use to insure an adequate supply being on hand at all times so as not to delay the work.
- 2. Paint shipped to the job shall arrive in sealed containers clearly marked with the type of paint and specifications controlling its manufacture.
- 3. There shall be no modification of the paint except upon, and in accordance with, express written stipulation by an authorized representative of the paint manufacturer and with specific approval of



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the Engineer.

**B. Storage**

1. Paint in storage at the shop or in the field shall have the position of the containers reversed at least once a week to prevent settlement and separation of the pigment from the vehicle. There shall be suitable devices maintained at the point of storage and used for agitation and thorough mixing of the paint prior to its use on this work.

**C. Sample Panel**

1. If directed by the Engineer, a sample panel shall be made up. The panel shall be used as a basis of comparison of the work on this contract. The panel shall be of size designated by the Engineer and shall be prepared and painted in all respects in the same manner as the work will be done.

**4. WORKMANSHIP****A. Weather Conditions**

1. Paint shall not be applied when the temperature of the air is less than 40 degrees F., when the surface of the metal is not dry, the relative humidity is above 85%, or when, in the opinion of the Engineer, conditions are otherwise unsatisfactory for such work. Paint shall not be applied upon damp, or frosted surfaces. Material painted under cover in damp or cold weather shall remain under cover until dry or until weather conditions permit its exposure in the open. Painting shall not be done when the metal is hot enough to cause the paint to blister and produce a porous paint film.

**B. Application**

1. Paint shall be applied in accordance with SSPC Specifications for Paint Application - PA1 and in accordance with manufacturer's recommendation.
2. All blast cleaned steel surfaces shall be primed before completion of the workday.
3. Steel shall be cleaned by washing, brushing or other mechanical means of all residue (loose foreign matter) prior to applying the finish coat.

**C. Removal of Unsatisfactory Paint**

1. If the Prime Coat "mud-cracks", the Finish Coat wrinkles or shows

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evidence of having been applied under unfavorable conditions or if the workmanship is poor, the Engineer may order it removed and the metal thoroughly cleaned and repainted. Any "Blushing" of the Finish Coat shall be corrected by solvent wiping and/or re-coating before final factory/shop acceptance by the Engineer.

**D. Thinning**

1. No thinner shall be used if the paint can be applied in a neat workmanlike manner without thinning. If the paint is too thick to spray, only the manufacturer's specified thinner (in hot weather vinyl paint shall be thinned with M.I.B.K. to reduce the chances of "Blushing" occurring) may be added to the paint up to 25% by volume or as otherwise specified by the manufacturer. Thinning shall not relieve the contractor from applying the specified coating D.F.T.

**E. Paint Touch-up**

1. After erection, all damaged areas shall be cleaned of mud and dirt by High Pressure Power Washing with clean water (3500 psi minimum); grease, and oil by solvent wiping; and rusted areas shall be cleaned by sand blasting or power tool cleaning with non-woven abrasives prior to touch-up or repair of any damaged areas of Finish coating. The paint used for touch-up shall be the same system used in the shop. The Contractor shall be responsible for cleaning all damaged surfaces and applying all field touch-up coatings in accordance with all manufacturer's recommendations. The Zinc Primer shall be touched up with only Organic Zinc Primer when applied in the field.

**F. Warranty**

1. The Fabricator and or Contractor will be required to guarantee his work against defective workmanship or the use of defective materials for a period of one (1) year from the completion of the contract.

**G. Handling Shop Primed Steel**

1. Only Nylon web slings or padded lifting points shall be used to move shop primed steel to prevent damage to the coating.

**5. ENVIRONMENTAL PROTECTION REQUIREMENTS****A. Air Quality Requirements**

1. Abrasive blasting operations shall be conducted in full compliance with all current national primary and secondary ambient air quality standards

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40 CFR 50 (for Particulate matter - 40 CFR 50.6; Lead - 40 CFR 50.12; and nuisance dust). Abrasive blasting operations shall also be compliant with any and all local and state air quality requirements.

**6. ENVIRONMENTAL PROTECTION STATEMENT**

A. "All collection, containment, disposal and transportation for disposal must be compliant with all applicable State, Federal and Local air pollution, water pollution, solid waste and hazardous waste regulations, ordinances or statutes."

**7. COMPENSATION**

All work covered by this section except for shop painting will be paid for at the contract lump sum price for "Painting of Structural Steel". Payment at the contract lump sum price for "Approx. \_\_\_\_\_ Lbs. Structural Steel" will be full compensation for the work of shop painting.

The above prices and payments will be full compensation for all work including but not limited to furnishing all paint, cleaning abrasives, cleaning solvents, and all other materials; protecting the work; protecting traffic and property; preparing and cleaning surfaces to be painted; applying paint in the shop and field; and furnishing blast cleaning equipment, paint spraying equipment, brushes, rollers, and any other hand or power tools, and any other equipment.

**Projects P-5705BA, P-5705BB****ST-53****Mecklenburg County****PILE PANEL RETAINING WALL****(SPECIAL)****1.0 DESCRIPTION**

This work consists of furnishing precast panels, structural steel, concrete, and all other materials; handling, transporting, fabricating, galvanizing, and storing materials; furnishing erection drawings, backfilling, pile excavation, erecting and installing the pile panel wall members, constructing coping and all other materials as required by the plans, Standard Specifications and this Special Provision.

**2.0 MATERIALS AND FABRICATION**

Provide materials and fabricate members in accordance with the requirements of the NCDOT Standard Specifications and the requirements shown on the contract plans. Construction materials and methods to be submitted to the Engineer. For materials and methods within live load zones of active railroad tracks, the Engineer will review according to railway standards for safety and work within live load zones.

Provide precast panels that are within  $\pm 1/4$  inch thick of the panel dimensions shown on the plans with a smooth, flat finish that meets Article 1077-11 of the Standard Specifications on one face. Install this face of the wall as the exposed face as shown on the plans. Furnish three 12" x 12" samples for approval which establish the acceptable variations in color, texture, and uniformity. After the color, texture, and uniformity of the furnished samples are approved, produce a full scale panel unit meeting design requirements. This mock-up and the furnished samples establish the base or standard quality for acceptance of the panels. When producing the final installed panels, use fine and coarse aggregate and cement from the same source as those used in the approved sample panels. Damaged panels with excessive discoloration, chips or cracks as determined by the Engineer will be rejected.

**3.0 CONSTRUCTION METHODS**

Provide consistent pile spacing throughout the length of the wall. Use odd pile spacings only as shown on the plans.

Excavate holes with the diameters shown on the plans. Perform pile excavation to the depths shown on the plans and install piles as shown on the plans or in the accepted submittals with a tolerance of 1/8 inch per foot from vertical. Construct the piles such that the axis of the pile at the top of the drilled pier is no more than 1 inch in any direction from the position shown on the plans. Pile placement shall provide a minimum bearing length of 4 inches for precast panels regardless of tolerances noted above. Backfill excavations with concrete after placing piles.

**A. Pile Excavation**

Use equipment of adequate capacity and capable of drilling through soil and non-soil including rock, boulders, debris, man-made objects and any other materials encountered. Blasting is not permitted to advance the excavation. Blasting for core removal is only permitted when approved by the Engineer. Dispose of drilling spoils in accordance with

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Section 802 of the NCDOT Standard Specifications and as directed by the Engineer. Drilling spoils consist of all excavated material including water removed from the excavation either by pumping or drilling tools.

Stabilize excavations with steel casing. When using steel casing, use either the sectional type or one continuous corrugated or non-corrugated piece. Steel casings should consist of clean watertight steel of ample strength to withstand handling and driving stresses and the pressures imposed by concrete, earth or backfill. Use steel casings with an outside diameter equal to the hole size and a minimum wall thickness of 1/4 inch. Steel casings will be submitted to the Engineer, for review according to railway standards.

**B. Concrete Placement**

Before placing concrete, center and support the pile in the excavation and check the water inflow rate in the excavation after any pumps have been removed. If the inflow rate is less than 6" per half hour, remove any water and free fall the concrete into the excavation. Ensure that concrete flows completely around the pile. If the water inflow rate is greater than 6" per half hour, propose a concrete placement procedure to the Engineer. The Engineer shall approve the concrete placement procedure before placing concrete.

Fill the excavation with Class AA concrete in accordance with the Standard Specifications except as modified herein. Provide concrete with a slump of 6" to 8". Use an approved high-range water reducer to achieve this slump. Place concrete in a continuous manner.

Construct concrete coping as shown in the plans and in accordance with Subarticle 452-3(C) of the Standard Specifications.

**4.0 WORKING DRAWINGS**

Submit casting drawings for the precast face panels for approval in accordance with Article 1077-2 of the NCDOT Standard Specifications prior to casting. Show the inserts, method of handling, and support details used for transportation on casting drawings. Submit metalwork fabrication drawings for approval prior to fabrication of steel wall components. Submit an erection plan and concrete face panel placing plan, including location of various heights of panels, for review and acceptance prior to fabrication of metalwork. Submit five sets of detail drawings.

**5.0 METHOD OF MEASUREMENT**

The quantity of pile panel wall to be paid for will be the actual square feet of precast panels used in the completed and accepted wall. Measurement will be made of the total area of precast panels used in the wall.

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**6.0 BASIS OF PAYMENT**

The quantity of pile panel wall, measured as provided above, will be paid for at the contract unit price bid per square foot for "Pile Panel Wall".

The unit price bid per square foot will be full compensation for all work covered by this Special Provision including, but not limited to, furnishing precast panels, structural steel, concrete, and all other materials; handling, transporting, fabricating, galvanizing, and storing materials; furnishing erection drawings, pile excavation including any casing or slurry, and erecting and installing the pile panel wall members.

Payment will be made under:

Pile Panel Retaining Wall..... Square Foot

**Projects P-5705BA, P-5705BB****ST-56****Mecklenburg County****JOINT SEALANTS AND CONSTRUCTION JOINT FILLER****(SPECIAL)****PART 1 – GENERAL****1.1. SUMMARY**

- A. This special provision shall cover all concrete joint sealants and construction joint filler materials and their application, wherever required for complete installation of building materials or systems.

**1.2. SUBMITTALS**

- A. General: For each submittal indicate the application and location within the structure for which the submittal applies.
- B. Product Data: For each type of product indicated.

**PART 2 – MATERIALS****2.1. JOINT SEALANTS**

- A. Use a moisture-cured, single-component, polyurethane base, non-sag, gun-grade elastomeric sealant compound at new expansion joints and control joints in cast-in-place concrete work as indicated on the Contract Drawings. Provide joint sealant that meets the requirements of ASTM C920, Type S, Grade NS, Class 25 and Use T or NT as applicable. Provide a backer rod that is closed-cell polyethylene foam rod, non-gassing with a diameter as recommended by the manufacturer for the joint width indicated. Use a backer rod that is compatible with the joint sealant and acceptable to the joint sealant manufacturer.
- B. VOC Limit (for LEED Credit): Provide joint sealant with maximum VOC content of 250 grams per liter.
- C. Acceptable Products/Manufacturers: Subject to compliance with requirements, provide one of the following:
1. Sikaflex 1-a; Sika Corporation, Lyndhurst, NJ.
  2. Eucolastic I; Euclid Chemical Company; Cleveland, OH.
  3. Sonolastic SL-1; BASF Building Systems, Shakopee, MN.
  4. Or approved equal.

**2.2. CONSTRUCTION JOINT FILLER**

- A. Provide a two-component, self-leveling, elastic type, modified epoxy or polyurea joint filler for filling and sealing narrow grooves in horizontal construction and control joints. Joint sealer shall be suitable to protect concrete joint edges in heavy duty, industrial concrete floors and wearing surfaces subject to abrasion,

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heavy traffic and concentrated loads. Suitable for applications where anticipated joint movement will not exceed 10 percent of opening width. Provide joint filler capable of 100 percent elongation with a minimum tensile strength of 325 psi, a Shore A hardness between 75 and 95 and minimum adhesion strength to concrete of 200 psi.

- B. Acceptable Products/Manufacturers: Subject to compliance with requirements, provide one of the following:
1. Groove and Crack Filler #250; Anti-Hydro International, Inc., Flemington, NJ.
  2. TF-100 Control Joint Filler, BASF Building Systems, Shakopee, MN.
  3. Or approved equal.

**PART 3 – EXECUTION****3.1. JOINT SEALANT AND BACKER ROD INSTALLATION**

- A. Install joint sealant to finish expansion joints where indicated on the Contract Drawings. Provide joint widths and sealant depths as shown, except that sealant depth shall not exceed 1/2 inch.
- B. Prepare joint surfaces to a sound, smooth, clean and dry condition free of visible contaminants. Where recommended by sealant manufacturer, apply compatible primer to dry joint surfaces.
- C. Control the depth of the sealant with the use of compatible joint fillers and backup materials. Install joint backing with approximately 30 percent compression to provide uniform depth of sealant in accordance with manufacturer's recommendations.
- D. Install joint sealant in strict accordance with manufacturer's recommendations.

**3.2. CONSTRUCTION JOINT FILLER**

- A. Provide narrow recess at the top of construction joints in the concrete slabs and walls as shown on the Contract Drawings.
- B. Prepare joint surfaces to a sound, smooth, clean and dry condition free of visible contaminants.
- C. After taping both sides of the joint, fill joint cavity flush or slightly higher than adjacent concrete surface with epoxy resin. Apply by brush or pour cans in accordance with the manufacturer's instructions.

**3.3. BASIS OF PAYMENT**



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- A. The entire cost of the joint sealants and construction joint filler installed shall be included in the unit contract price bid for "Class AA Concrete."

**LIQUID FLOOR TREATMENTS****(SPECIAL)****PART 1 – GENERAL****1.1. SUMMARY**

- A. This special provision consists of all materials, labor, and equipment required to provide liquid floor treatments of all concrete floors for the platform structure, concourse structure and ramps, complete and in place as specified herein and as required for a complete installation.

**1.2. SUBMITTALS**

- A. General: For each submittal indicate the application and location within the structure for which the submittal applies.
- B. Product Data: For each type of product indicated.

**1.3. PERFORMANCE REQUIREMENTS**

- A. Mock-up for Concrete Floor Finish
1. Construct a floor finish mock-up at the project site for each type of concrete floor finish specified and as directed by the Resident Engineer. Construct each mock-up to be a minimum size of one foot square by 2-inches thick except as otherwise specified herein. Concrete shall conform to the applicable material and workmanship requirements of Class AA Concrete.
  2. The sample mock-ups shall be subject to review and approval by the Resident Engineer and the Engineer. The approved floor finish sample mock-ups shall remain at the Owner's field trailer throughout the duration for which concrete floor finish work is performed. The sample mock-ups will be used as a basis for the approval of the in-place concrete floor finishes. Remove the mock-ups from the premises after completion of the work or as directed by the Resident Engineer.

**PART 2 – MATERIALS****2.1. LIQUID FLOOR TREATMENTS**

- A. Penetrating Liquid Floor Treatment: Clear, chemically reactive, waterborne solution of inorganic silicate or silicate materials and proprietary components;

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odorless; that penetrates, hardens, and densifies concrete surfaces.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
  - a. BASF Corporation; MasterProtect H 1001.
  - b. Euclid Chemical Company (The), an RPM company; Barcade WB 244.
  - c. Vexcon Chemicals, Inc.; Powerseal 40 Penetrating Sealer.

### **PART 3 – EXECUTION**

#### **3.1. LIQUID FLOOR TREATMENT APPLICATION**

- A. Penetrating Liquid Floor Treatment: Prepare, apply, and finish penetrating liquid floor treatment according to manufacturer's written instructions.
  1. Remove curing compounds, sealers, oil, dirt, laitance, and other contaminants and complete surface repairs.
  2. Do not apply to concrete that is less than 14 days old.
  3. Apply liquid until surface is saturated, scrubbing into surface until a gel forms; rewet; and repeat brooming or scrubbing. Rinse with water; remove excess material until surface is dry. Apply a second coat in a similar manner if surface is rough or porous.
- B. Sealing Coat: Uniformly apply a continuous sealing coat of curing and sealing compound to hardened concrete by power spray or roller according to manufacturer's written instructions.

#### **3.2. PROTECTION OF LIQUID FLOOR TREATMENTS**

- A. Protect liquid floor treatment from damage and wear during the remainder of construction period. Use protective methods and materials, including temporary covering, recommended in writing by liquid floor treatments installer.

#### **3.3. BASIS OF PAYMENT**

- A. The quantity of liquid floor treatment will be paid for at the contract unit price bid per square foot for "Liquid Floor Treatment".
- B. The unit price bid per square foot will be full compensation for all work covered by this Special Provision including, but not limited to, surface preparation, furnishing and placing Liquid Floor Treatment.
- C. Payment will be made under:

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Liquid Floor Treatment Square Foot

**FOUNDATION WATERPROOFING****(SPECIAL)****PART 1 – GENERAL****1.1. SUMMARY**

A. This special provision includes, but is not limited to, the furnishing and installation of the following materials, per project specifications and drawings, and as directed by the waterproofing material manufacturer's representative.

1. Bentonite geotextile waterproofing membrane with all applicable accessory products.
2. Insulation drainage panels.

B. Provide bentonite geotextile waterproofing system to prevent the passage of liquid water and install without defects, damage, or failure. Waterproofing shall be an active-polymer core technology with all applicable accessory products. Bentonite geotextile waterproofing system shall be provided for the concourse structure, baggage ramp structure, and 4<sup>th</sup> Street egress stair structure walls and under the base slab foundations.

**1.2. QUALITY ASSURANCE**

A. Codes, Regulations, Reference Standards, and Specifications:

1. Codes and regulations of the jurisdictional authorities.
2. ASTM International (ASTM):
  - a. ASTM C272, Standard Test Method for Water Absorption of Core Materials
  - b. ASTM D146, Standard Test Methods for Sampling and Testing Bitumen-Saturated Felts and Woven Fabrics for Roofing and Waterproofing.
  - c. ASTM D412, Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers – Tension.
  - d. ASTM D449, Standard Specification for Asphalt Used in Dampproofing and Waterproofing.
  - e. ASTM D638, Standard Test Method for Tensile Properties of Plastics.
  - f. ASTM D751, Standard Test Methods for Coated Fabrics.
  - g. ASTM D1621, Standard Test Method for Compressive Properties of Rigid Cellular Plastics.
  - h. ASTM D1668, Standard Specification for Glass Fabrics

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(Woven and Treated) for Roofing and Waterproofing.

3. Federal Test Method Standard (FTMS): 101B.

**B. Installer Qualifications:**

1. Installing company should have extensive experience in work of the type required by this section, who can comply with manufacturer's warranty requirements, and who is an Approved Applicator as determined by waterproofing manufacturer. Qualifications to be submitted to the Engineer for review and acceptance.

**C. Manufacturer Qualifications:**

1. Waterproofing membranes and all accessory products shall be provided by a single manufacturer with extensive experience in the direct production and sales of waterproofing systems. Manufacturer shall be capable of providing field service representation during construction, approving an acceptable installer, and recommending appropriate installation methods.

**D. Single Source:**

1. Obtain primary waterproofing materials of each type required from a single manufacturer to assure material compatibility. Provide secondary materials only as recommended by manufacturer of primary materials.

**E. Independent Inspection:**

1. Make necessary arrangements and payments for an independent inspection service to monitor waterproofing material installation compliance with the project contract documents and manufacturer's published literature and site-specific details at no additional cost to the Owner. Independent Inspection Firm shall be approved by the Engineer and be a participant with the waterproofing manufacturer's Certified Inspection Program with documentation showing the manufacturer accepts that the inspection will meet all warranty requirements for the material.
2. Inspection service shall produce reports and digital photographs documenting each inspection. Reports shall be made available to the Contractor, waterproofing installer, waterproofing material manufacturer, and the Owner's representative. Inspections should include substrate examination, beginning of waterproofing installation, periodic intervals, and final inspection prior to concrete or backfill

placement against the waterproofing.

F. Water Sample Test:

1. Project site water sample supplied to manufacturer by waterproofing contractor to determine type of bentonite system (standard sodium bentonite or contaminate resistant (CR) sodium bentonite) to be utilized on the project. Manufacturer shall conduct test free of charge. Contractor is responsible for collection and shipment of one liter of actual site water. Water should be shipped in uncontaminated, sealed plastic containers labeled with project name, city, and state along with return address to forward test results.

G. Pre-Installation Conference:

1. Approximately 7 days in advance of installation of waterproofing, a pre-installation conference shall be held prior to commencement of field installation to establish procedures to maintain required working conditions and to coordinate this work with related and adjacent work. Additional pre-installation requirements shall include verifying that final waterproofing details comply with waterproofing manufacturer's current installation requirements and recommendations; physically viewing all waterproofing locations; reviewing requirements and procedures for application of waterproofing membrane; coordination of these activities; and satisfying any conditions which might interfere with proper application.
2. Conference shall be attended by the Contractor, Construction Manager, waterproofing subcontractor, concrete contractor, excavating/backfill contractor, mechanical and electrical contractors if work penetrates the waterproofing, the specific waterproofing foreman for the project, the owner's representative, and a representative from the manufacturer. Notify the Owner at least 48 hours before conducting the meeting.

1.3. SUBMITTALS

A. Submit the following for approval in accordance with these special provisions and with the additional requirements as specified for each:

1. Product Samples: Three of each type of the following materials used in the work:
  - a. Bentonite geotextile membrane waterproofing: 12 inches square.
  - b. Water soluble film tubing filled with bentonite: Two feet long.
  - c. Granular bentonite: One-pound containers.
  - d. Seam tape: Two feet long.

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- e. Termination bar: Two feet long.
  - f. Mastic/Caulk: One pint container.
2. **Product Data:** Submit manufacturer's product data, complete with general and specific installation instructions, recommendations, limitations, and data sheets indicating tensile strength, elongation, puncture resistance, resistance to hydrostatic head, pliability, permeability, and water migration.
3. **Material Certificates:** Submit certificate(s) signed by manufacturer certifying materials comply with specified performance characteristics and physical requirements. Submit certification that waterproofing system and components are supplied by a single- source manufacturer.
4. **Contractor Certificate:** At time of bid, submit written certification that installer has current Approved Applicator status with waterproofing material manufacturer.
5. **Certification:** Prior to submittal of shop drawings, submit a certification that the waterproofing materials are compatible with the groundwater and soil characteristics. Perform required groundwater and soil testing to confirm compatibility of materials at no additional cost to the Owner.
  - a. Certify that the shop drawings and installation instructions submitted correctly describe the waterproofing system to be installed.
  - b. Prior to installation, certify that the substrate is in an acceptable condition for membrane installation and that the materials furnished are compatible with each other.
  - c. At completion of the installation, certify that the materials used in the work were in accordance with these Specifications and that they were installed in accordance with the material manufacturer's installation instructions and recommendations.
6. **Independent Inspection Reports:** Submit copies of project inspection reports confirming proper installation of the waterproofing system.
7. **Shop Drawings:** Submit shop drawings, certified as reviewed and approved by the manufacturer showing waterproofing membrane details at penetrations in the membrane (for pipes, conduits, etc.), corners of structures, ends of the membrane, joints in the structure, and interfaces with adjacent structures. Indicate joint or termination detail conditions, and conditions of interface with other materials. Indicate the sequence of installation of the materials.

**Projects P-5705BA, P-5705BB****ST-64****Mecklenburg County****1.4. DELIVERY, STORAGE, AND HANDLING**

- A. Delivery and Handling: Deliver materials in factory sealed and labeled packaging. Sequence deliveries to avoid delays, while minimizing on-site storage. Handle and store following manufacturer's instructions, recommendations and material safety data sheets. Protect from construction operation related damage and prolonged weather exposure. Remove damaged material from site and dispose of in accordance with applicable regulations.
- B. Storage: Do not double-stack pallets during shipping or storage. During storage protect waterproofing materials from moisture, excessive temperatures and sources of ignition. Provide cover, top and all sides, for materials stored on-site, allowing for adequate ventilation.

**1.5. PROJECT CONDITIONS****A. Environmental Requirements:**

- 1. Substrate Condition: Proceed with work only when substrate construction and preparation work is complete and in condition to receive waterproofing system.
- 2. Weather Conditions: Install products and accessories specified herein when surface and ambient temperatures are satisfactory per the manufacturer's recommendations. Proceed with waterproofing and associated work only when existing and forecasted weather conditions will permit work performance in accordance with manufacturer's recommendations and warranty requirements for specific project requirements. Application of waterproofing to surfaces on which ice or frost is visible is prohibited. Substrate must be free of ponded water.
- 3. Verify that items penetrating through surfaces to receive waterproofing are rigidly installed.
- 4. Verify that surfaces are free of cracks, depressions, or projections that may be detrimental to successful installation.
- 5. Bentonite waterproofing shall NOT get wet prior to backfilling or pouring of adjacent concrete. Waterproofing MUST be contained to work properly.
- 6. Though exposure to precipitation and ground water seepage typically will not adversely affect the bentonite geotextile waterproofing membrane, the General Contractor shall maintain site conditions to remove standing water from precipitation or ground water seepage in a timely manner. Should the bentonite geotextile waterproofing membrane be subjected to pre-hydration as a result of prolonged immersion, inspection of the material and written acceptance from the manufacture is required prior to concrete or backfill placement.

**1.6. WARRANTY**

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- A. Upon completion and acceptance of the work required by this section, the waterproofing materials manufacturer will provide a written ten (10) year system warranty, covering both materials and labor, to the project owner. Issuance of Manufacturer's System Warranty requires the following: (1) System waterproofing products and protection course products shall have been provided by a single manufacturer; (2) Installation of waterproofing products and protection course products by Manufacturer's Approved Applicator; (3) Installation inspected by Independent Inspection Firm per Section 1.2E. (4) Manufacturer's approved surface applied waterstop must be installed in all applicable horizontal and vertical cold pour concrete construction joints and around applicable penetrations.
- B. Manufacturer's warranty shall be independent from any other warranties made by the Contractor under requirements of the Contract Documents and may run concurrent with the other warranties. This warranty must be in addition to and not a limitation of other rights the Owner may have against the contractor under the General Provisions.

**PART 2 – PRODUCTS****2.1. MANUFACTURER**

- A. Basis of Design Manufacturer: Ultraseal waterproofing membranes and applicable accessories as manufactured by Colloid Environmental Technologies Company (CETCO), 2870 Forbs Ave, Hoffman Estates, IL 60192, USA. Phone: (847) 851-1800; Fax: (847) 851-1899; Web site: <http://buildingmaterials.cetco.com/>.
- B. Or approved equal.

**2.2. MATERIALS****A. ULTRASEAL<sup>®</sup> - APC WATERPROOFING MEMBRANES**

1. ULTRASEAL BT MEMBRANE: 100-mil (2.3 mm) thick composite membrane consisting of an active-polymer core (APC) integrally bonded to a geomembrane liner using a proprietary mechanical process. ULTRASEAL BT applications include backfilled walls, property line retention walls, and earth covered structures. Roll size: 4' x 25' (1.2 x 7.62 m)
2. ULTRASEAL SP MEMBRANE: 200-mil (4.7 mm) thick composite membrane consisting of an active-polymer core (APC) encapsulated by a



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geomembrane liner and a geotextile using a proprietary mechanical process. ULTRASEAL SP application - under structural slabs. Roll size: 4' x 25' (1.2 x 7.62 m)

Ultraseal BT performance properties:

PROPERTY	TEST METHOD	TYPICAL VALUE
Hydrostatic Pressure Resistance	ASTM D 5385 mod.	231 ft. (70 m)
Permeability	ASTM D 5084	$<1 \times 10^{-11}$ cm/sec.
Grab Tensile Strength	ASTM D 4632	150 lbs.
Puncture Resistance	ASTM D 4833	70 lbs.
Low Temperature Flexibility	ASTM D 1970	Unaffected at -25°F (-32°C)
Elongation	ASTM D 4632	50%
Peel Adhesion to Concrete	ASTM D 903 mod.	10 lbs. /in.

Ultraseal SP performance properties:

PROPERTY	TEST METHOD	TYPICAL VALUE
Hydrostatic Pressure Resistance	ASTM D 5385 mod.	231 ft. (70 m)
Permeability	ASTM D 5084	$<1 \times 10^{-11}$ cm/sec.
Grab Tensile Strength	ASTM D 4632	300 lbs.
Puncture Resistance	ASTM D 4833	130 lbs.
Low Temperature Flexibility	ASTM D 1970	Unaffected at -25°F (-32°C)
Elongation	ASTM D 4632	75%
Peel Adhesion to Concrete	ASTM D 903 mod.	10 bs. /in.

2.3. MASTIC/CAULK: TROWEL GRADE SODIUM BENTONITE COMPOUND USED AS A DETAILING MASTIC AROUND PENETRATIONS, CORNER TRANSITIONS AND GRADE TERMINATIONS

- A. Water soluble film tubing filled with bentonite: 2" (50 mm) diameter x 2' (50 cm) long, water-soluble tube container filled with granular sodium bentonite.
- B. Granular Bentonite: 50 lbs. (22.7 kg) bag of granular sodium bentonite, similar to material used in membranes specified above, for use in forming coves and for filling voids during installation of waterproofing systems.
- C. Seam tape: 2" (50 mm) wide butyl rubber sealant tape used for permanently sealing waterproofing membrane seams; compatible with membrane system used.
- D. Termination Bar: Min. 1" (25 mm) wide aluminum bar with pre-punched holes on 12" (300 mm) centering for use as termination bar, edge protector, or caulk bar for membranes and systems specified.
- E. Tape for temporarily exposed conditions: Manufacturer's standard adhesive coating on PVC-coated fabric for use at membrane joints and terminations temporarily exposed to the elements during construction, prior to concealment or backfill.
- F. Primer for tapes: Bonding agent for use as primer at concrete, masonry, and metal surfaces and as directed by manufacturer.
- G. Water barrier tape: Tape consisting of a layer of bentonite, sandwiched between

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an open woven mesh and a spun bond polypropylene fabric, with one side coated with pressure-sensitive adhesive and release paper.

**2.4. OTHER MATERIALS**

- A. Protection Course: Extruded-polystyrene board insulation, unfaced, ASTM C 578, Type VI, 40-psi (276-kPa) minimum compressive strength, 1/2 inch thick minimum, fabricated with shiplap or channel edges and with one side having grooved drainage channels. Product must be acceptable for use below grade. Provide all required tapes or primers for installation per manufacturer's instructions.
- B. Water: Clean, clear, non-alkaline and free of salts and other harmful elements; potable.

**PART 3 – EXECUTION****3.1. GENERAL**

- A. Comply with contract documents and manufacturer's product data, including product application and installation instructions.

**3.2. SUBSTRATE INSPECTION AND CONDITIONS**

- A. The installer, with the Independent Inspector present, shall examine conditions of substrates and other conditions under which this section work is to be performed and notify the contractor, in writing, of circumstances detrimental to the proper completion of the work. Do not proceed with work until unsatisfactory conditions are corrected and are acceptable for compliance with manufacturer's warranty requirements. General substrate conditions acceptable for the waterproofing installation are listed below. For conditions not covered in this Section, contact the waterproofing manufacturer's representative for guidance.
- B. Soil Substrates: Site conditions allowing, bentonite geotextile waterproofing membrane applications do not require a mud-working slab. Grade substrates should consist of well-leveled soils without voids and debris, and compacted to a minimum of 95% Modified Proctor density. If substrate consists of large aggregate, place a high-strength geotextile layer over the aggregate and then provide several inches of compacted soil or sand for uniform support and containment of waterproofing membrane.
- C. Concrete: Reinforced structural slabs should be a minimum of 6" (150 mm) thick when placed on a working mud slab. Reinforced concrete slab(s) on compacted grade shall be a minimum of 4" (100 mm) thick. Install bentonite geotextile waterproofing membrane under all footings, elevator pits, and grade beams. Cast-

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in-place concrete to receive waterproofing shall be of sound structural grade with a smooth finish, free of debris, oil, grease, laitance, dirt, dust, or other foreign matter which will impair the performance of the waterproofing and drainage system and which do not comply with manufacturer's warranty requirements. Bentonite geotextile waterproofing membrane can be installed on structural concrete as soon as the forms are removed and curing is completed. Form fins, ridges, and other protrusions should be level and smooth with monolithic concrete surface. Honeycombing, aggregate pockets, tie-rod holes, and other voids should be completely filled with non-shrink cementitious grout and level with monolithic concrete surface.

NOTE: Surface applied waterstops shall be installed in all applicable vertical and horizontal concrete construction cold pour joints and around applicable penetrations and structural members. Refer to the surface applied waterstop Product Manual for further installation procedures and guidelines.

3.3. **MECHANICAL OR OTHER PENETRATIONS:** Mechanical, structural, or architectural materials that will pass through the plane of the waterproofing membrane shall be properly installed and secured in their final position prior to installation of the waterproofing system.

3.4. **PREPARATION**

A. **Layout:** Lay out project to determine anticipated conditions prior to start of work. Note termination and penetration conditions and determine preferred methods for creating waterproof envelope.

B. **Surface Preparation:**

1. Remove all previous waterproofing membranes, dirt, debris, oil, grease, cement laitance, or other foreign matter that will impair or negatively affect the performance of the bentonite geotextile waterproofing membrane. Vacuum or broom clean surfaces to receive waterproofing, tape, adhesive products, or primers. Do not install membranes or systems in standing water. Note temperature limitations for each product.
2. Protect adjacent work areas and finish surfaces from damage or contamination from waterproofing products during installation operations.

3.5. **GENERAL INSTALLATION GUIDELINES**

A. Under the Elevator pit slabs, install Ultraseal SP horizontally with the white liner side facing down. Overlap Ultraseal SP membrane edges minimum 4" (100 mm). Backfilled walls of the elevator pit, install Ultraseal BT with the white liner side outward, away from the concrete, facing the installer. For backfilled walls overlap Ultraseal BT membrane edges a minimum 2" (50mm) and tape overlaps

with CETCO Seamtape.

- B. Prevent waterproofing products from hydrating before material is contained with overburden or backfill. When threat of rain is imminent, installed waterproofing products not already contained by overburden or backfill should be covered with polyethylene sheeting to decrease the chance of hydration. Remove polyethylene prior to concrete or backfill placement. After any precipitation, standing water should be pumped off waterproofing as soon as possible.
- C. Protection Course: Protection board shall be installed per manufacturer's requirements and shall not compromise waterproofing membrane. Area must be backfilled immediately following installation of protection board. See Section 3.10 below.

### 3.6. UNDER SLAB INSTALLATION – BACKFILLED WALL APPLICATION

- A. Install Ultraseal SP under all elevator pits and sumps in pits.
- B. Install Ultraseal SP membrane (poly side down; tan geotextile side up) extending to the perimeter edges of the elevator pit slab, up the outside edges of the pit slab and extending an additional 12" (300 mm). The 12" tail shall be wrapped over the pit slab once the pit wall is cast. Overlap edges of adjacent Ultraseal SP sheets a minimum 4" (100 mm) and secure to prevent sheet movement during construction or concrete placement.
- C. Place Ultraseal SP directly on properly prepared substrate (poly side down; tan geotextile side up facing installer) with adjoining edges overlapped a minimum of 4" (100 mm). Stagger sheet end seams a minimum of 24" (60 cm). Mechanically fasten or staple Ultraseal SP 12" (300 mm) on center to prevent movement from construction operations or concrete placement. When the slab is poured in sections, extend Ultraseal SP a minimum 12" (300 mm) beyond the slab edge to enable proper overlapping.
- D. Detail all slab penetrations, and drilled piers, install 1/4" (6 mm) thick layer of Waterstoppage extending a 6" (150 mm) radius. Cut Ultraseal SP to fit snugly around penetrations and pile caps. Around base of penetrations trowel 3/4" (18 mm) thick fillet of Bentoseal and extend the Bentoseal up the penetration 1-1/2" (38 mm) and onto the Ultraseal SP. Around drilled piers trowel 3/4" (18 mm) thick fillet of Bentoseal and extend the Bentoseal up pier and onto Ultraseal SP a minimum 2" (50 mm).
- E. Inspect finished Ultraseal SP installation and repair any damaged material prior to concrete slab placement.

NOTE: Waterstop-RX shall be installed in all slab joints, around applicable slab penetrations and structural members. Refer to Waterstop-RX Product Manual for

further installation procedures and guidelines.

### 3.7. BACKFILLED CAST-IN-PLACE CONCRETE WALLS

- A. Place Hydrobar Tubes along the wall/footing intersection with ends “buted” tightly together to form a continuous installation.
- B. Trowel 3/4" (18 mm) thick, continuous Bentoseal fillet at all inside wall corner transitions. Trowel Bentoseal form-tie pockets/patches and any slightly irregular honeycomb areas.
- C. Starting at the base of the wall, install Ultraseal BT sheet horizontally (APC side against the wall; white poly side facing installer) covering the Hydrobar Tubes, cover the entire outside horizontal edge of the pit slab and overlap waterproofing membrane from underslab work a minimum of 6" (150 mm). Attach Ultraseal BT using washer-headed mechanical fasteners maximum 24" (600 mm) on center. Cut and install a section over the uncovered footing area. Apply BENTOSEAL at the corner section to the overlaps. Overlap all adjacent sheet edges a minimum 2" (50 mm). Stagger all vertical overlap seams a minimum of 12" (300 mm). Tape all membrane overlap seams with CETCO Seamtape.
- D. After the bottom horizontal course, Ultraseal BT sheets can be installed either vertically or horizontally oriented. Continue Ultraseal BT installation up wall to finished grade elevation, staggering all sheet roll ends of adjacent courses a minimum 12" (300 mm). Do not allow horizontal Ultraseal BT overlap joints to run at same elevation as the concrete pour lift joints. Overlap all adjacent Ultraseal BT sheet edges a minimum 2" (50 mm) and secure with washer-head fastener maximum 24" (600 mm) on center. Tape all membrane overlap seams with CETCO Seamtape.
- E. Cut Ultraseal BT to fit snugly around penetrations. Detail around all penetrations with 3/4" (18 mm) cant of Bentoseal. Completely fill any space between the penetration and Ultraseal BT edge. Extend Bentoseal 1/4" (6 mm) thick over substrate a minimum radius of 1-1/2" (38 mm) and onto penetration. Tape all membrane overlap seams with CETCO Seamtape.
- F. 12" (300mm) below finished grade, terminate Ultraseal BT at grade elevation detail with aluminum termination bar fastened 12" (300 mm) on center to exterior surface of concrete wall. Apply continuous bead of CETSEAL top edge of Ultraseal BT to seal edge to concrete. Install fully adhered CETCO grade flashing strip to concrete with bottom edge overlapping top of Ultraseal BT termination minimum 4" (100 mm); overlap flashing strip ends a minimum 3" (75mm). Then apply bead of CETSEAL along the top edge of the flashing strip and along overlap seams. Secure drainage sheet to concrete wall with mechanical fasteners.
- G. Inspect finished Ultraseal BT installation and repair any damaged material prior

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to backfill placement. Assure that Ultraseal BT is not displaced during backfill placement or soil compaction.

**3.8. CAST-IN-PLACE CONCRETE WALL EXCAVATION AND BACKFILL**

- A. Closely coordinate bentonite geotextile waterproofing membrane installation with Backfill conducted under Division 2 work. Care should be used during backfill operation to avoid damage to the waterproofing system. Follow generally accepted practices for backfilling and compaction. See Division 2 for backfill requirements.

**3.9. OTHER LOCATIONS**

- A. For waterproofing membrane installation procedures for applications not covered within these specifications, install the bentonite geotextile waterproofing membrane system as shown on the contract drawings and as recommended by the waterproofing membrane manufacturer.
- B. Installation procedures as outlined in previous sections for substrate preparation and membrane anchorage, overlaps, penetrations and repairs shall be followed.

**3.10. PROTECTION OF WATERPROOFED SURFACES**

- A. Install protection surfaces as soon as practicable after waterproofing membrane is placed. Do not place loads on exposed waterproofing membrane. Traffic on exposed waterproofing membrane is prohibited.
- B. Provide temporary protection as required pending installation of permanent protection and/or backfilling.
- C. Exercise care in backfilling and/or placing protection courses against waterproofing membrane so as not to break, tear, puncture, or otherwise damage waterproofing membrane.
- D. Insulation Drainage Panel Installation:
  - 1. Install over waterproofed surfaces. Cut and fit to within  $\frac{3}{4}$  inch (19 mm) of projections and penetrations.
  - 2. Ensure that drainage channels are aligned and free of obstructions. On vertical surfaces, set insulation units in adhesive or tape applied according to manufacturer's written instructions.

**3.11. REPAIR OF LEAKS**

- A. Repair leak areas by means of bentonite slurry, epoxy injection, or both methods to provide impervious and watertight envelope around affected areas.

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- B. Pump bentonite slurry toward outside of structure through drilled holes, at a pressure not exceeding 50 psi, to create waterproof layer. Submit schedule and application methods per manufacturer's warranty for approval before proceeding with work.

## 3.12. CLEAN UP

- A. Clean areas where adjacent finished surfaces are soiled by work of this Section. Remove all tools, equipment, and remaining product on-site. Dispose of section work debris and damaged product following all applicable regulations.

## 3.13. BASIS OF PAYMENT

- A. The quantity of foundation waterproofing will be paid for at the contract unit price bid per square yard for "Foundation Waterproofing".
- B. The unit price bid per square yard will be full compensation for all work covered by this Special Provision including, but not limited to, surface preparation, furnishing and placing foundation waterproofing.
- C. Payment will be made under:

Foundation Waterproofing	Square Yard
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**TEMPORARY SOIL NAIL WALL:****(SPECIAL)**

## 1.1 PART 1 – GENERAL SUMMARY

- A. This work consists of the construction of temporary soil nail walls connected to a reinforced shotcrete face as specified herein and shown on the plans. Construct temporary soil nail walls as indicated in the Contract Documents based on actual elevations and wall dimensions in accordance with the accepted submittals through the use of a prequalified Specialty Contractor.

## B. Definitions:

Soil Nail Wall - A temporary support of excavation system composed of grouted steel nail inclusions with a structural shotcrete face applied.

Soil Nail - a steel bar grouted in a drilled hole inclined at an angle below the horizontal plane.

Verification Nail - A sacrificial nail where a load test will be performed as described in this provision.

Proof tests - A capacity test performed on nails incorporated into the temporary wall, i.e., production nails.

## 1.2 QUALITY ASSURANCE

- A. Qualifications:

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1. The Contractor may be the prime Contractor or their approved subcontractor performing this work, and regularly engaged in the installation of the soil nails. The Contractor will be experienced in the construction of soil nails and having successfully constructed at least three permanent soil nail walls during the past five years totaling at least 10,000ft<sup>2</sup> of soil nail wall face area and at least 500 soil nails is required.
2. Provide an on-site supervisor and drill rig operators with experience on at least 3 projects over the past 5 years installing soil nails.
3. Provide a foreman in charge of the shotcrete operation who has a minimum of five years' experience of shotcrete application, two of which will be as nozzleman.
4. Provide a nozzleman who will have served at least 6 months apprenticeship on similar applications and will be able to demonstrate by tests, his ability to perform satisfactorily his duties and to gun shotcrete of the required quality before beginning production work.

**1.3 SUBMITTALS**

- A. Schedule. Do not begin until Submittals 1 through 3 have been received and reviewed with no exception taken by the Engineer. Additional time required due to incomplete or unacceptable submittals is not cause for delay or impact claims. All costs associated with incomplete or unacceptable Contractor submittals are the responsibility of the Contractor. Provide submittal items 1 through 3 at least 21 days prior to initiating soil nail installation. Review by the Engineer does not relieve the Contractor of his responsibility for the installation of the soil nails that meet the requirements shown on the Contract Drawings.
- B. Submit the qualification documentation required under "Qualifications".
- C. Surveys. The Contractor is responsible for providing the necessary survey and alignment control during the excavation for each lift, locating drill-holes and verifying limits of the soil nail wall installation.
- D. Shop Drawings. Include in the shop drawings drill hole diameter, grout mix design and compressive strength, soil nail details including, but not limited to nominal length and size of soil nails, inclination angle, centralizers, grouting pressure, working and staging areas and layout drawings showing the proposed soil nail numbering plan and sequence of soil nail installation.
- E. Work Plan. Describe the installation and equipment in the work plan, including vertical clearance compared to clearance available, manufacturer's information, model, size and type of equipment, track protection personnel required, and approved work shifts.

Describe in the work plan the methods to be used for installation of the soil nails, including the consecutive steps and the approximate time required for each step and labor and equipment usage schedule, any interference to any existing structures, facilities, or utilities as a result of the soil nail installation, methods to be used to control and verify soil nail position and battered alignment, procedures for proper removal and disposal of all wastes, including groundwater, and spoils including drilling fluid, cuttings, and grout, details of centralizers, and the procedures for placing the grout.



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Include details in the work plan for pressure grouting when used, including the method, grouting pressure, procedure, and equipment to be used. Include in the work plan methods to flush the drilled hole, methods and equipment for measuring volumes of grout placed in each hole, depths, and pressures, and estimated curing time for grout to achieve specified strength. Calculate the grouting rate based on the initial pump pressures or static head on the grout and losses throughout the placing system, including anticipated head of drilling fluid (if applicable) to be displaced. Additionally, calculate the grouting rate by counting the number of throws it takes for the pump to fill a 55-gallon drum. Divide the volume of drum by the total number of throws to determine the volume of grout per throw. Include in the work plan details and descriptions of the Verification Load Test and Proof Load Test. Include in the work plan the location of the Verification Load Test. The Verification load test shall be located along the facing footprint of the wall. Submit calibration table and graph of force vs. gauge pressure for the load testing equipment dated within the last six months.

- F. Materials Certifications. Submit the grout mix design and documentation from an independent testing laboratory. Include the proportions of the batch, the manufacturer of the components, the specific gravity, and compressive strength results in this submission.

Submit calibration reports and data for each test jack, pressure gauge and master pressure and electronic load cell to be used. The calibration tests will be performed by an independent testing laboratory, and tests will be performed within 90 days of the date submitted. Do not commence testing until the Engineer has reviewed and accepted the jack, pressure gauge and electronic load cell calibration data.

**PART 2 - PRODUCTS****2.1 MATERIALS**

Refer to Division 10 of the *Standard Specifications*.

<u>Item</u>	<u>Section</u>
Anchor Pins	1056-2
Geocomposites	1056
Grout, Type 2	1003
Reinforcing Steel	1070
Shotcrete	1002
Select Material, Class IV	1016
Steel Plates	1072-2

Use Class IV select material (standard size No. ABC) for temporary guardrail and neat cement grout for Type 2 grout.

Provide soil nails consisting of grouted steel bars and nail head assemblies. Use deformed steel bars that meet AASHTO M 31, Grade 75 for production nails and AASHTO M 31, Grade 150 for the verification nail. Splice bars in accordance with Article 1070-9 of the *Standard Specifications*.

Fabricate centralizers from schedule 40 PVC plastic pipe or tube, steel or other material not

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detrimental to steel bars (no wood). Size centralizers to position bars within 1" of drill hole center and allow tremies to be inserted to ends of holes. Use centralizers that do not interfere with grout placement or flow around bars.

Provide nail head assemblies consisting of nuts, washers and bearing plates. Use steel plates for bearing plates and steel washers and hex nuts recommended by the Soil Nail Manufacturer.

Provide Type 6 material certifications for soil nail materials in accordance with Article 106-3 of the *Standard Specifications*. Store steel materials on blocking at least 12" above the ground and protect it at all times from damage; and when placing in the work make sure it is free from dirt, dust, loose mill scale, loose rust, paint, oil or other foreign materials. Load, transport, unload and store soil nail wall materials so materials are kept clean and free of damage. Bent, damaged or defective materials will be rejected.

**PART 3 – EXECUTION****3.1 PRECONSTRUCTION REQUIREMENTS****A. Preconstruction Meeting**

Before starting soil nail wall construction, hold a preconstruction meeting to discuss the verification load test, construction, inspection and testing of the soil nails. If this meeting occurs before all soil nail wall submittals have been accepted, additional preconstruction meetings may be required before beginning construction of soil nail walls without accepted submittals. The Engineer, District or Bridge Maintenance Engineer, Bridge or Roadway Construction Engineer, Geotechnical Operations Engineer, Contractor and Soil Nail Wall Contractor Superintendent will attend preconstruction meetings. Monitoring of the NS tracks located behind the wall will be discussed.

**3.2 CONSTRUCTION METHODS**

Control drainage during construction in the vicinity of soil nail walls. Direct run off away from soil nail walls and areas above and behind walls. Control grout overflow and drilling spoils from running down the slope into the adjacent drainage ditch.

Do not excavate behind soil nail walls. If overexcavation occurs, repair walls with an approved method and additional nails may be required.

Install positive protection in accordance with the contract and accepted submittals. If directed by the Engineer, use PCB in accordance with Section 1170 of the *Standard Specifications* and Standard Drawing No. 1170.01 of the *Roadway Standard Drawings*. If directed by the Engineer, use temporary guardrail in accordance with Section 862 of the *Standard Specifications* and Standard Drawing No. 862.01, 862.02 and 862.03 of the *Roadway Standard Drawings*.

**A. Excavation**

Excavate for soil nail walls from the top down in accordance with the accepted submittals. Excavate in staged horizontal lifts with no negative batter (excavation face leaning forward). Excavate lifts in accordance with the following:

- (1) Heights not to exceed vertical nail spacing,
- (2) Bottom of lifts no more than 3 ft below the installed nail locations for

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current lift

Remove any cobbles, boulders, rubble or debris that will protrude more than 2" into the required shotcrete thickness. Rocky ground such as colluvium, boulder fills and weathered rock may be difficult to excavate without leaving voids. Fill voids with shotcrete.

Apply shotcrete to excavation faces within the same shift of excavating each lift unless otherwise approved. Shotcreting may be delayed if it can be demonstrated that delays will not adversely affect excavation stability. If an excavation becomes unstable at any time, suspend soil nail wall construction and temporarily stabilize the excavation by immediately placing an earth berm up against the unstable excavation face. When this occurs, repair walls with an approved method and additional nails may be required.

**B. Soil Nails**

Drill and grout nails the same day and do not leave drill holes open overnight. Control drilling and grouting to prevent excessive ground movements, damaging structures and pavements or fracturing rock and soil formations. If ground heave or subsidence occurs, suspend soil nail wall construction and take corrective action to minimize movement. If property damage occurs, make repairs with an approved method and revise the means and method such that no property damage occurs.

**(1) Drilling**

Use drill rigs of the sizes necessary to install soil nails and with sufficient capacity to drill through whatever materials are encountered. Drill straight and clean holes with the dimensions and inclination shown in the accepted submittals. Drill holes within the below tolerances:

Horizontal and vertical alignment of nails within 6" of location shown in the accepted submittals, except for nails # 1, 2, 9, 10, 11, 19, 20, 26, 27, 29 where the horizontal and vertical alignment will be within 2" of location shown in the accepted submittals. Care shall be taken to ensure the Contractor does not damage the concrete piles supporting the existing abutment. If a pile is encountered the Contractor shall notify the Engineer, the hole grouted and the soil nail location shall be offset to avoid the existing pile.

Angle of installation shall maintain a tolerance within 2° of inclination shown in Contract drawings.

Stabilize drill holes with temporary casings if unstable, caving or sloughing material is anticipated or encountered. Do not use drilling fluids to stabilize drill holes or remove cuttings.

**(2) Steel Bars**

Center steel bars in drill holes with centralizers such that the soil nail bars are within 1 inch of the center of drill hole. Securely attach centralizers along bars at no more than 8 ft centers. Attach uppermost and lowermost centralizers 18" from excavation faces and ends of holes.

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Do not insert steel bars into drill holes until hole locations, dimensions, inclination and cleanliness are approved. Do not vibrate, drive or otherwise force bars into holes. If a steel bar cannot be completely and easily inserted into a drill hole, remove the bar and clean or re drill the hole.

**(3) Grouting**

Grout the drill hole after installation of the soil nail bar within 2 hours of completion of drilling. Remove oil, rust inhibitors, residual drilling fluids and similar foreign materials from holding tanks/hoppers, stirring devices, pumps, lines, tremie pipes and any other equipment in contact with grout before use. Measure grout temperature, density and flow during grouting with at least the same frequency grout cubes are made for compressive strength. Perform density and flow field tests in the presence of the Engineer in accordance with American National Standards Institute/American Petroleum Institute Recommended Practice 13B-1 (Section 4, Mud Balance) and ASTM C939 (Flow Cone), respectively. Test grout in accordance with ASTM C 109 at a frequency of one test for every 1 CY of grout placed. Provide grout cube test results to the Engineer within 24 hours of testing.

Inject grout at the lowest point of drill holes through tremies, e.g., grout tubes, casings, hollow-stem augers or drill rods, in one continuous operation. Fill drill holes progressively from ends of holes to excavation faces and withdraw tremies at a slow even rate as holes are filled to prevent voids in grout. Extend tremies into grout at least 5 ft at all times except when grout is initially placed in holes. Inject grout until rich, undiluted grout is observed exiting the nail hole.

Provide grout free of segregation, intrusions, contamination, structural damage or inadequate consolidation (honeycombing). Cold joints in grout are not allowed except for test nails. Remove any temporary casings as grout is placed and record grout volume for each drill hole.

**(4) Nail Heads**

Install nail head assemblies after shotcreting. Before shotcrete reaches initial set, seat bearing plates and tighten nuts so plates contact shotcrete uniformly. If uniform contact is not possible, install nail head assemblies on mortar pads so nail heads are evenly loaded.

**C. Drain Strips**

Install geocomposite drain strips as shown in the accepted submittals. Before installing shotcrete reinforcement, place drain strips with the geotextile side against excavation faces. Hold drain strips in place with anchor pins so strips are in continuous contact with surfaces to which they are attached and allow for full flow the entire height of soil nail walls. Discontinuous drain strips are not allowed. If splices are needed, overlap drain strips at least 12" so flow is not impeded. Cut off excess drain strip length and expose strip ends below shotcrete when soil nail wall construction is complete.

**D. Shotcrete**

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Clean ungrouted zones of drill holes and excavation faces of loose materials, mud, rebound and other foreign material. Moisten surfaces to receive shotcrete. Install shotcrete reinforcement in accordance with the contract and accepted submittals. Secure reinforcing steel so shooting does not displace or vibrate reinforcement. Install approved thickness gauges on 5 ft centers in the horizontal and vertical directions to measure shotcrete thickness.

Apply shotcrete in accordance with the contract, accepted submittals and Subarticle 1002-3(F) of the Standard Specifications. Use approved shotcrete nozzlemen who made satisfactory preconstruction test panels to apply shotcrete. Direct shotcrete at right angles to excavation faces except when shooting around reinforcing steel. Rotate nozzle steadily in small circular patterns and apply shotcrete from bottom of lifts up.

Make shotcrete surfaces uniform and free of sloughing or sagging. Completely fill ungrouted zones of drill holes and any other voids with shotcrete. Taper construction joints to a thin edge over a horizontal distance of at least the shotcrete thickness. Wet joint surfaces before shooting adjacent sections.

Repair surface defects as soon as possible after shooting. Remove any shotcrete which lacks uniformity, exhibits segregation, honeycombing or lamination or contains any voids or sand pockets and replace with fresh shotcrete to the satisfaction of the Engineer. Protect shotcrete from freezing and rain until shotcrete reaches initial set.

### 3.3 TRACK MONITORING DURING CONSTRUCTION

Establish monitoring points along the tracks that will be in service during the installation of the nails. Perform monitoring work under the direction of qualified railroad personnel. Each monitoring location shall include a point on the tie for Horizontal and vertical measurements. In wood ties, the point shall be marked with a PK nail or similar surveyor's marker; on concrete or steel ties the point shall be marked with paint.

Reference points shall be established along the track beginning at the point where the work is closest to the track. Points shall continue to be placed at every other tie along the length of the wall and then at 50 feet away from the work along the tracks from each end point of the wall.

Measurement Accuracy:

Monitoring shall be done to 0.01 feet.

Monitoring shall be performed every two hours during the shift of the soil nail installation. Points shall be measured, the measurements recorded, and the numbers compared with previous measurements.

If the contractor observes any movement, the Norfolk Southern Engineer shall be notified and means and methods shall be revised if and when directed by the Norfolk Southern Engineer.

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Any Track Deficiencies in track surface and alignment caused by construction activities shall be immediately corrected as directed by the Engineer at an expense to the Contractor.

**3.4 CONSTRUCTION RECORDS**

Provide 2 copies of soil nail wall construction records within 24 hours of completing each lift. Include the following in construction records:

- (1) Names of Soil Nail Wall Contractor, Superintendent, Nozzleman, Drill Rig Operator, Project Manager and Design Engineer;
- (2) Wall description, county, Department's contract, TIP and WBS element number;
- (3) Wall station and number and lift location, dimensions, elevations and description;
- (4) Nail locations, dimensions and inclinations, bar types, sizes and grades and temporary casing information;
- (5) Date and time drilling begins and ends, steel bars are inserted into drill holes, grout and shotcrete are mixed and arrives on-site and grout placement and shotcrete application begins and ends;
- (6) Grout volume, temperature, flow and density records;
- (7) Ground and surface water conditions and elevations if applicable;
- (8) Weather conditions including air temperature at time of grout placement and shotcrete application; and
- (9) All other pertinent details related to soil nail wall construction.

After completing each soil nail wall or stage of a wall, provide a PDF copy of all corresponding construction records.

**A . Nail Testing**

Proof test at least one nail per nail row. The Engineer will determine the location of proof tests. Do not test nails until grout and shotcrete attain the required 3 day compressive strength.

**B. Test Equipment**  
At minimum use the following equipment to test nails:

- (1) Two dial gauges with rigid supports,
- (2) Hydraulic jack and pressure gauge and
- (3) Jacking block or reaction frame.

Provide dial gauges with enough range and precision to measure the maximum test nail movement to 0.001". Use pressure gauges graduated in 100 psi increments or less. Align test equipment to uniformly and evenly load test nails. Use a jacking block or reaction frame that does not damage or contact shotcrete within 3 ft of nail heads. Place dial gauges opposite each other on either side of test nails and align gauges within 5° of bar inclinations. Set up test equipment so resetting or repositioning equipment during nail testing is not needed.

**C. Test Nails**

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Test nails include both unbonded and bond lengths. Grout only bond lengths before nail testing.

**D. Verification Tests**

Perform verification test prior to start of construction of production nails. Allow the Engineer 7 days to review the results. The purpose of the verification load test is to verify that the Contractor's means and method will achieve the minimum grout to ground bond assumed for design. If the results of the verification load test indicate that the minimum grout to ground bond is not achieved, revise the work plan and indicate the revised methods to achieve the minimum assumed grout to ground bond. A new verification load test on a new installed sacrificial nail will be performed until the Contractor's means and methods have proofed the minimum assumed grout to ground bond. Do not change means and methods once the verification test results have been approved by the Engineer. The verification nail will be constructed to the same angle about the horizontal plane as the production nails. The angle about the vertical plane for the verification nail will be 00. A minimum of 14 psi grout to ground bond is required. The bond length at the verification test location will be 21 feet and unbonded length will be 4 feet.

Perform verification test by incrementally loading nails based on the following schedule:

<b>Load</b>	<b>Hold Time</b>
0.05 DL (AL)*	1 Minutes
0.5 DL	10 Minutes
1.0 DL	10 Minutes
1.5 DL	10 Minutes
2.0 DL	10 Minutes
2.5 DL	10 Minutes
3.0 DL (Creep Test)	60 Minutes
3.5 DL	10 Minutes
4.0 DL	10 Minutes
0.1 DL (AL)*	1 Minute (record permanent set)

\* Alignment load (AL) is the minimum load needed to align test equipment and should not exceed 0.05 DL.

Use Design Load (DL) as indicated in Contract Drawings. Reset dial gauges to zero after applying alignment load. Record test nail movement at each load increment and monitor test nails for creep at the 3.0 DL load increment. Measure and record movement during creep test at 1, 2, 3, 4, 5, 6, 10, 20, 30, 50 and 60 minutes. Repump jack as needed to maintain load during hold times.

**E. Proof Tests**

Perform one proof test at each row as selected by the Engineer. The bond length at

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the proof test location will be 15.5 feet and unbonded length will be 9.5 feet.

Perform proof tests by incrementally loading nails to a load of 150% of DL based on the following schedule:

<b>Load</b>	<b>Hold Time</b>
AL*	Until movement stabilizes
0.25 DL	Until movement stabilizes
0.50 DL	Until movement stabilizes
0.75 DL	Until movement stabilizes
1.00 DL	Until movement stabilizes
1.25 DL	Until movement stabilizes
1.50 DL	10 or 60 minutes (creep test)
AL*	1 minute

\* Alignment load (AL) is the minimum load needed to align test equipment and should not exceed 0.05 DTL.

Reset dial gauges to zero after applying alignment load. Record test nail movement at each load increment and monitor test nails for creep at the 1.5 DTL load increment. Measure and record movement during creep test at 1, 2, 3, 5, 6 and 10 minutes. If test nail movement between 1 and 10 minutes is greater than 0.04", maintain the 1.5 DTL load increment for an additional 50 minutes and record movement at 20, 30, 50 and 60 minutes. Repump jack as needed to maintain load during hold times.

#### F. Test Nail Acceptance

Submit 2 copies of test nail records within 24 hours of completing each proof test. The Engineer will review the test nail records to determine if test nails are acceptable.

Maintain stability of unbonded lengths for subsequent grouting. If a test nail is accepted but the unbonded length cannot be satisfactorily grouted, do not incorporate the test nail into the soil nail wall and add another production nail to replace the test nail.

If the Engineer determines a test nail is unacceptable, either perform an additional verification test on adjacent production nails or revise the installation methods for the production nails represented by the unacceptable test nail as determined by the Engineer. After completing nail testing for each row provide a PDF copy of all corresponding test nail records.

#### 3.5 MEASUREMENT AND PAYMENT

Temporary soil nail wall will be paid for at the contract lump sum price for "Temporary Railroad Shoring for Abutment 1 Sta. 42+59.56 -A1-".

The contract lump sum price for "Temporary Railroad Shoring for Abutment 2 Sta. 42+59.56 -A1-" will be full compensation for providing soil nail wall, submittals, labor, tools, equipment and soil nail wall materials, excavating, hauling and removing excavated materials, installing and testing soil nails, grouting, shotcreting and supplying drain strips and any incidentals necessary to construct soil nail walls. No additional payment will be made and no extension of completion date or time will be allowed for repairing property



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damage, overexcavations or unstable excavations, unacceptable test nails or thicker shotcrete.

No payment will be made for temporary shoring not shown in the plans or required by the Engineer including shoring for OSHA reasons or the Contractor's convenience. No value engineering proposals will be accepted based solely on revising or eliminating shoring locations shown in the plans or estimated quantities shown in the bid item sheets as a result of actual field measurements or site conditions.

**CLASS AA CONCRETE (RETAINING WALL)****(SPECIAL)****Materials**

Class AA concrete for cast-in-place retaining walls shall meet the requirements of Section 1000 of the NCDOT Standard Specifications for Roads and Structures.

**Installation**

Installation and Placement of concrete for cast-in-place retaining walls shall meet the requirements of Section 420 of the NCDOT Standard Specifications for Roads and Structures.

**Basis of Payment**

Payment for the Class AA Concrete for cast-in-place retaining walls will be made at the contract unit price per cubic yard bid for "Class AA Concrete". Such unit price shall be full compensation for all items required to construct the cast-in-place concrete retaining walls.

**SUBSTRUCTURE CONCRETE PLACEMENT AND ACCEPTANCE****(SPECIAL)**

Installation and placement of concrete for cast-in-place substructure (abutments and piers) shall meet the requirements of Section 420 of the NCDOT Standard Specifications for Roads and Structures. If anchor bolt holes are placed incorrectly, the substructure concrete shall be demolished and re-poured with an approved repair workplan. The Contractor may submit a workplan to attempt to re-drill the anchor bolt holes for consideration by the Engineer.

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**REINFORCEMENT STEEL BAR (75 KSI)****(SPECIAL)****1.0 DESCRIPTION**

Where the contract plans indicate Grade 75 reinforcement is used (only), this special provision replaces Article 1070-2 – Reinforcement Steel Bar for Roads and Structures of the Standard Specifications. No other sections or articles of the Standard Specifications are modified by this provision.

Steel bar reinforcement shall be furnished and installed as indicated on the contract plans and in accordance with the Standard Specifications, as modified herein.

**2.0 MATERIAL REQUIREMENTS**

All reinforcing steel must be provided by a NCDOT approved facility. Supply deformed steel bar reinforcement conforming to the requirements of ASTM A615, Grade 75. For uncoated deformed and/or plan reinforcing, furnish the Engineer a Type 1 certification in accordance with Article 106-3 and attach it an M&T Form 913 for each shipment of reinforcing material. Bend and cut during fabrication with tolerances in accordance with the *Manual of Standard Practice* published by the Concrete Reinforcing Steel Institute and/or AASHTO LRFD Bridge Construction Specifications, Section 9. Bend the bars cold to the details shown in the plans.

Weld steel bar reinforcement only where shown in the plans or approved by the Engineer. When welding steel bar reinforcement use bars conforming to ASTM A706. Where individual butt-welded hoops are substituted for spiral reinforcement in columns and drilled shafts, the hoops shall be welded prior to galvanizing.

**3.0 CONSTRUCTION REQUIREMENTS**

The requirements of Article 425 – Fabricating and Placing Reinforcement and Article 710 – Reinforcing Steel of the Standard Specifications shall apply.

**4.0 BASIS OF ACCEPTANCE**

The requirements of Article 425 – Fabricating and Placing Reinforcement and Article 710 – Reinforcing Steel of the Standard Specifications shall apply.

**5.0 BASIS OF PAYMENT**

The provisions of Article 425-6 – Measurement and Payment of the Standard Specifications shall apply.

Payment will be made under:

<b>Pay Item</b>	<b>Unit</b>
Reinforcing Steel, Black (Grade 75)	Pound
Spiral Reinforcing Steel, Black (Grade 75)	Pound

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**GALVANIZED STEEL BAR REINFORCEMENT (75 KSI)****(SPECIAL)****1.0 DESCRIPTION**

This special provision addresses furnishing and placing bar reinforcement with hot dipped galvanized coating as indicated on the contract plans. This provision supplements the Standard Specifications, including the following sections and articles:

<b>Section/Article</b>	<b>Item/Description</b>
425	Fabricating and Placing Reinforcement
1070	Reinforcing Steel
1070-2	Reinforcement Steel Bar for Roads and Structures
1078-8	Spiral Column Reinforcing Steel
1078-9	Mechanical Butt Splices

Galvanized steel bar reinforcement shall be furnished and installed as indicated on the contract plans and in accordance with the Standard Specifications, as modified herein.

**2.0 MATERIAL REQUIREMENTS**

**A. Reinforcing Steel.** Steel reinforcing bars shall be deformed billet steel bars meeting the requirements of ASTM A615, Grade 75.

**B. Galvanizing.** The bar reinforcement shall be galvanized in accordance with ASTM A767 "Standard Specification for Zinc-Coated (Galvanized) Steel Bars for Concrete Reinforcement" to a Class I Coating.

**C. Embrittlement Testing.** The coating applicator shall take the necessary precautions to prevent embrittlement by conforming to the requirements of ASTM A143 "Standard Practice for Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel Products and Procedures for Detecting Embrittlement". The test for embrittlement shall be conducted by the coating applicator or his representative according to the bend test described in ASTM A615 "Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement". The coating applicator shall include one reinforcing bar test specimen at least 3 feet long for each lot for this testing. The test specimen shall have the same diameter as the lot members and shall be quenched, and galvanized in the same manner and at the same time as the bars whose characteristics it is intended to represent. If the test specimen cracks or otherwise fails the bend test, the entire lot it represents shall be rejected. For test purposes, a lot is any one of the following:

- Reinforcing bars of the same diameter comprising a single order
- A number of reinforcing bars of the same diameter identified as a lot by the coating applicator, providing the bars are all been coated within a single production shift
- One thousand reinforcing bars of the same diameter. Notwithstanding the above two, no lot shall exceed one thousand bars.

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**D. Identification.** The Contractor shall coordinate the tagging and identification requirements for the project and for lot identification and shall provide a non-destructive metal tag system for bent reinforcing bars.

**E. Inspection.** The Department shall be notified 30 days prior to the beginning of the coating application. The Department representative and any other Department-authorized representative shall have free access to the plant for inspection. Work done while any Department representative has been refused access shall be automatically rejected.

If the Department representative so elects, preparation of the bars, quenching and coating shall be done in his presence. On a random basis, lengths of coated bars may be taken by the representative from the production run at the point of coating application for test, evaluation, and check purposes.

**F. Zinc Rich Paint.** Zinc rich paint used for field repairs of galvanized coatings shall meet the following requirements:

- One application of the material shall provide a dry film thickness of 2 mils
- The dried fill shall have a minimum zinc dust content of 94% by mass
- The paint shall be compatible with the galvanizing and shall be inert in concrete
- The brand of material used shall be approved by the galvanizer.

**G. Mechanical Connectors for Reinforcing Bar Splices.** Mechanical connectors used on galvanized bar reinforcement shall be galvanized in accordance with Section 1076 – Galvanizing and Article 1076-4 – Hardware of the Standard Specifications.

**3.0 CONSTRUCTION REQUIREMENTS**

**A. Handling and Storage.** All galvanized bar reinforcement shall be stored above ground on wood or padded supports and arranged so that rainwater drains off the bars.

**B. Bending of Bar Reinforcement.** The galvanized bar reinforcement shall be shop bent before galvanizing. Up to 5% of the mass of bars may be field-bent to replace missing, damaged, or incorrectly fabricated bars. Field-bending shall be done by cold methods only. When bending galvanized bar reinforcement size 7 and greater, the minimum bend radius measured to the inside face of the bend shall be increased to 4.5 times the bar diameter. For bars numbered 14 and 18, increase the bend radius to 5.5 times the bar diameter.

Field-bending operations will be allowed only when ambient and bar temperatures are 40°F or greater. When lower temperatures prevail the Contractor may supply, for field-bending operations, a fully enclosed space that is heated. Direct heating of the bars shall not be permitted.

The ends of bars cut after galvanizing shall be coated with zinc repair material following the procedures of Article 1076-7 – Repair of Galvanizing, except that repair materials containing aluminum shall not be permitted.

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Galvanizing damaged by field-bending work shall be evaluated and repaired, or replaced, in accordance with the requirements of 3.0 C – Field Repair of Galvanized Coatings, herein.

**C. Field Repair of Galvanized Coatings.** The Contractor shall field repair damaged areas of the bar coating, and replace bars exhibiting severely damaged coatings. Severe damage is defined as more than five (5) 1/4 x 1/4 inch or larger areas in a 10-foot length. The material and procedures used for field repair shall meet the requirements of Article 1076-7 – Repair of Galvanizing, except that repair materials containing aluminum shall not be permitted.

**D. Welded Splices.** Prior to welding galvanized bar reinforcement, the zinc coating shall be removed for the length of the weld plus 2 inches on each side of the weld. Cleaning shall be the same criteria as for epoxy-coated reinforcing. Coating repair shall be in accordance with the requirements of 3.0 C – Field Repair of Galvanized Coatings, herein.

Weld steel bar reinforcement only where shown in the plans or approved by the Engineer. When welding steel bar reinforcement use bars conforming to ASTM A706. Where individual butt-welded hoops are substituted for spiral reinforcement in columns and drilled shafts, the hoops shall be welded prior to galvanizing.

**4.0 BASIS OF ACCEPTANCE**

The requirements of Article 425 – Fabricating and Placing Reinforcement and Article 710 – Reinforcing Steel of the Standard Specifications shall apply, except as modified herein.

The coating applicator shall furnish a Certificate of Compliance with each shipment of coated bars. The Certificate of compliance shall state the representative samples of the coated bars have been tested and that the test results conform to the requirements described herein. Test results shall be retained and made available, if requested. The Certificate of Compliance and the documentation required for uncoated reinforcement bars by the sections and articles of the Standard Specifications listed under 1.0 – Description, above, shall accompany each shipment to the job site.

**5.0 BASIS OF PAYMENT**

The provisions of Article 425-6 – Measurement and Payment of the Standard Specifications shall apply.

Payment will be made under:

<b>Pay Item</b>	<b>Unit</b>
Reinforcing Steel, Galvanized (Grade 75)	Pound
Spiral Reinforcing Steel, Galvanized (Grade 75)	Pound

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**ARMORLESS EXPANSION JOINT SYSTEMS****(SPECIAL)****1.0 DESCRIPTION**

This work shall consist of furnishing and installing armorless expansion joint systems. The particular armorless expansion joint system required will be as indicated on the contract plans. The Contractor shall notify the Engineer of the name and address of the fabricator of all bridge joint systems within fourteen (14) days of contract award.

An armorless joint system shall consist of one of the following types:

- Armorless joint system with preformed closed-cell foam material
- Armorless joint system with preformed seal
- Armorless joint system with structural silicone sealant (pourable seal)

The armorless joint system shall be as furnished by one of the approved suppliers listed under 2.0 – Material Requirements, below. The required method of joint installation shall be in accordance with the recommendations of the approved supplier(s), subject to review and approval of the Engineer.

Armorless expansion joints shall be furnished and installed as indicated on the contract plans and in accordance with the Standard Specifications, as modified herein.

**2.0 MATERIAL REQUIREMENTS**

Armorless expansion joint systems shall be as furnished by one of the approved suppliers listed below.

***A. Armorless joint system with preformed closed-cell foam material:***

BRAND NAME	SUPPLIER/LOCATION
Ceva Pro-Flex 2000 with MetaZeal	Chase Construction Products Westwood, MA
Ceva 250 System with Physite 380	Chase Construction Products Westwood, MA
Liquid Ply-Krete™ 750	Polyset Company, Inc. Mechanicville, NY
Ply-Krete™ FS 350	Polyset Company, Inc. Mechanicville, NY
Ply-Krete™ HS 350	Polyset Company, Inc. Mechanicville, NY
Ply-Krete™ LV 350	Polyset Company, Inc. Mechanicville, NY
S900-SFP Armorless Bridge Joint System	C.S. Behler Inc. Lancaster, NY
S2000-SFP Expansion Joint System	C.S. Behler Inc. Lancaster, NY

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Wabo@Crete FlexFoam - EV series	Watson Bowman Acme Corporation Amherst, NY
Zed Seal with Poly-Tron	R.J. Watson, Inc. Amherst, NY

**B. Armorless joint system with preformed seal.**

BRAND NAME	SUPPLIER/LOCATION
Silicoflex Armorless Bridge Joint System	R. J. Watson, Inc. Amherst, NY

**C. Armorless joint system with structural silicone sealant (pourable seal).**

BRAND NAME	SUPPLIER/LOCATION
S2000-DC902	C. S. Behler, Inc. Lancaster, NY
Roklin CWG-SikaSil	Roklin Systems, Inc. Henderson, NY
Wabo@Crete Silicone Seal Armorless Joint System	Watson Bowman Acme Corporation Amherst, NY
XJS Expansion Joint System	C.S. Behler Inc. Lancaster, NY

**D. Shop Drawings.** The applicable provisions of Standard Specifications, including Section 105 – Control of Work, shall apply with the following modifications.

Shop drawings will be required for any joint system supplied as part of this work. Shop drawings shall meet the various applicable requirements of the Standard Specifications and this subsection. All shop drawings shall note the name and address of the joint system (or segment) fabricator as well as the location where the joint system (or segments) are to be fabricated.

Shop drawings shall be submitted for review, approval, and distribution in accordance with the requirements of the Standard Specifications, Section 105 – Control of Work. The shop drawings shall indicate the type, location and details of the mechanical devices required to compress the joint to its required width based on the ambient temperature at the time of installation.

No shop work shall begin prior to the Contractor's receipt of approved shop drawings.

**3.0 CONSTRUCTION REQUIREMENTS**

The construction details for armorless expansion joints shall be in accordance with applicable provisions of the Standard Specifications, as specified below, and in accordance with the approved shop drawings.

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**A. Manufacturer's Representative.** The joint system shall be installed in strict accordance with the manufacturer's instructions and the approved shop drawings. In the event of a conflict, the terms of the approved shop drawings shall govern. A representative of the bridge joint system manufacturer shall be present prior to placement to inspect the prepared surfaces and remain at the job during all phases of the installation. The representative shall be fully conversant in all respects with the correct installation methods. The representative shall be responsible to advise both the Engineer and the Contractor on properly installing the joint system. The representative may be excused from the project site at the discretion of the Engineer.

**B. Preparation.** All surfaces shall be prepared as per the manufacturer's instructions and the approved shop drawings. At a minimum, the preformed recess which is to receive the joint system shall be air blown using air free of water and oil or vacuum-cleaned so that all loose or foreign matter is removed prior to installation of the system. The substrate shall be dry for a minimum of 24 hours prior to installation for the joint system.

**C. Storage, Inspection and Handling.** The joint system shall be stored, inspected, and handled in accordance with the manufacturer's instructions and the approved shop drawings.

**D. Installation Inspection.** All installation work shall be subject to the Engineer's inspection.

**E. Watertight Integrity Test.** At least five work days after the joint system has been fully installed the Contractor shall test the entire (full length) joint system for watertight integrity. The entire joint system shall be covered with water, either ponded or flowing, for a minimum duration of 15 minutes.

The concrete surfaces under the joint shall be inspected during this 15-minute period, and also for a minimum of 45 minutes after the supply of water has stopped, for any evidence of dripping water or moisture. Water tightness shall be interpreted to be no free dripping water on any surface on the underside of the joint. Patches of moisture shall not be cause for non-acceptance.

Should the joint system exhibit evidence of water leakage at any place whatsoever, the Contractor shall locate the place(s) of leakage and take all measures necessary to seal the leak. A subsequent water integrity test shall be performed subject to the same conditions and consequences as the original test.

**4.0 METHOD OF MEASUREMENT**

Measurement will be made as the number of feet of joint armorless joint system completely installed, measured horizontally and vertically along the centerline of joint system between the outer limits as indicated on the contract plans.

The words "completely installed" shall be interpreted to mean the joint system in place with the following operations completed where applicable:



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- All sealant in its proper position.
- Concrete placed and finished.
- Elastomeric concrete placed and finished.
- Water-tight integrity tests.

**5.0 BASIS OF PAYMENT**

The unit price bid per foot shall include all labor, materials, and equipment necessary to complete the work. No additional payment will be made for corrective actions.

Payment will be made under:

<b>Pay Item</b>	<b>Unit</b>
Armorless Expansion Joint System	Linear Foot

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**LIGHTNING PROTECTION SYSTEM**

**(SPECIAL)**

**1.0 DESCRIPTION**

This work shall consist of furnishing, installing, and testing lightning protection systems as required by the contract plans, Standard Specifications and this Special Provision.

**2.0 MATERIAL REQUIREMENTS**

Provide materials and equipment in accordance with the requirements of the NCDOT Standard Specifications and the requirements shown on the contract plans.

**3.0 CONSTRUCTION REQUIREMENTS**

Installation and testing of the lightning protection systems shall be in accordance with the requirements of the NCDOT Standard Specifications and the requirements shown on the contract plans. All work shall be completed to the satisfaction of the Engineer.

**4.0 BASIS OF PAYMENT**

Payment will be made under:

<b>Pay Item</b>	<b>Unit</b>
Lightning Protection System	Each

**Projects P-5705BA, P-5705BB****ST-92****Mecklenburg County****EXPLORATORY TEST BORINGS****(SPECIAL)****1.0 DESCRIPTION**

This work shall consist of performing an exploratory test boring at each drilled shaft as indicated in the contract plans and in accordance with the NCDOT Geotechnical Engineering Unit Geotechnical Investigation and Recommendations Manual(NCDOT Manual), dated March 29, 2016, and this Special Provision. Any discrepancies between this special provision and the NCDOT Manual shall defer to the more stringent requirement, unless otherwise approved by the Engineer in writing.

**2.0 REFERENCES**

The following is a list of publications referenced in this Section:

- NCDOT Geotechnical Engineering Unit – Geotechnical Investigation and Recommendations Manual, March 29, 2016
- ASTM D1586 – Standard Penetration Test (SPT) and Split-Barrel Sampling of Soils
- ASTM D2113 – Rock Core Drilling and Sampling of Rock for Site Investigation
- ASTM D2487 – Classification of Soils for Engineering Purposes (Unified Soil Classification System)
- International Society for Rock Mechanics (ISRM) – Suggested Methods for the Quantitative Description of Discontinuities in Rock Masses

**3.0 DEFINITIONS**

Competent rock is defined as un-weathered to slightly weathered rock with a Rock Quality Designation (RQD) of 25% or greater and minimum recovery of 90% for each 5-ft. core run.

**4.0 BORING AND SAMPLING**

- A. At least 2 weeks before any shaft excavation, the Contractor shall perform an exploratory test boring at each drilled shaft as indicated in the contract plans. The test borings shall extend to a minimum of 10 continuous feet into competent rock or as indicated in the contract plans, whichever is deeper. Competent rock shall be as defined in 3.0, above.
- B. The exploratory test borings shall be performed by an independent drilling firm with a minimum of 10 years drilling experience and approved by the Engineer. All borings shall be inspected and logged by a geologist or geotechnical engineer with a minimum of 5 years of boring and rock coring inspection and logging experience and approved by the Engineer. Notify the Engineer a minimum of 48 hours prior to the commencement of any exploratory test boring. The Engineer will be present during the exploratory test boring to observe the borings and sampling operations, and logging procedures. Provide necessary accommodation and assistance to the Engineer during his presence.
- C. The test borings shall include both soil sampling starting at the ground surface and rock coring and shall consist of NX or NQ size triple tube split inner core barrel starting at the

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top of rock. Split spoon samples shall be obtained with Standard Penetration Tests at 5-foot intervals in soil and completely weathered rock deposits in accordance with ASTM D1586. Coring shall be performed in accordance with ASTM D2113. The test borings shall be cased from the ground surface to the final core run.

- D. It is important that the percentage of recovery of the cores be as high as possible; the Contractor shall regulate the speed of the drill and remove the core frequently to maintain a maximum percentage of recovery, and special care shall be taken where the character of the rock being penetrated is uncertain.
- E. Cores shall be carefully removed from the core barrel, classified, and stored in well-constructed wooden core boxes with secure covers to prevent disturbance to the core during handling. The core samples will become the property of the NCDOT, and the Contractor will provide a location on site for their storage until the NCDOT can take possession. The Contractor shall deliver the core boxes and soil samples to the NCDOT Geotechnical Engineering Unit.
- F. The Contractor shall exercise particular care in recording water losses, rod jerks, rod drops, changes in rotation speed and other unusual coring observations that will serve to supplement the core record and data regarding the nature and the extent of any fracturing, soft seams, voids and other characteristics of the formations being cored. The test boring logs shall include rock description, rock quality designation (RQD), and rock recovery for each core run. Soil shall be classified in accordance with the requirements of ASTM D2487. The rock shall be logged in conformance with the recommendations and terminology presented in the ISRM, "Suggested Methods for the Quantitative Description of Discontinuities in Rock Masses".
- G. RQD is a modified core recovery percentage in which the pieces of core over 4 inches long are summed and divided by the length of the core run. Note that only those pieces of rock that are classified as moderately weathered to unweathered should be considered in the RQD count.
- H. The result of the test borings shall be submitted to the Engineer for review before the start of any drilled shaft excavation. Field logs of the borings shall be submitted to the Engineer by 8:00 a.m. on the next working day after completing each boring; a typed log including color photos of all rock cores shall be submitted to the Engineer within five (5) working days after completing each boring.
- I. Fill drill holes with cement grout by tremie method after completion.
- J. Provide a minimum 48-hour advance notice to the Engineer before drilling of a boring starts. The Engineer may inspect the boring operation. Provide all necessary assistance as required for the Engineer's inspection.
- K. The purpose of the borings is to verify the top of rock. The Engineer shall review the boring logs and shall submit within 7 days any revisions to the drilled shaft location plan and the bottom of shaft elevation if necessary.

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**5.0 METHOD OF MEASUREMENT**

Measurement will be made as the number of linear feet of exploratory test borings performed in accordance with this Special Provision.

**6.0 BASIS OF PAYMENT**

The unit price bid per foot shall include all labor, materials, and equipment necessary to complete the work.

Payment will be made under:

<b>Pay Item</b>	<b>Unit</b>
Soil / Rock Borings	L.F.

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**ARCHITECTURAL FIN RAIL**  
**(ALUMINUM HAND RAIL AND FIN ASSEMBLY)**

**(SPECIAL)**

The Architectural Fin Rail shall be as shown on the Plans. The quantity of handrail and architectural fin assembly to be paid for will be the actual number of linear feet of handrail measured continuously along the top rail from end to end, which has been completed and accepted. Full compensation for the work shall include, but is not limited to, furnishing posts, rails, architectural fins, fittings and all other materials and fabricating and erecting the metal hand rail and fin assembly. The quantity of metal rail architectural fin assembly as measured above will be paid for at the contract unit price per linear foot for “Architectural Fin Rail (Aluminum Hand Rail And Fin Assembly)”.

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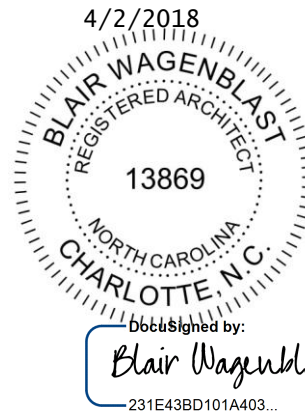
Mecklenburg County

## PROJECT SPECIAL PROVISIONS PLATFORM AND CONCOURSE - ARCHITECTURE

State ID #17-17955-01A

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SECTION 055000 - METAL FABRICATIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
  - 1. Abrasive metal nosings.
- B. Products furnished, but not installed, under this Section include the following:
  - 1. Anchor bolts, steel pipe sleeves, slotted-channel inserts, and wedge-type inserts indicated to be cast into concrete or built into unit masonry.

1.3 COORDINATION

- A. Coordinate installation of metal fabrications that are anchored to or that receive other work. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

1.4 ACTION SUBMITTALS

- A. Product Data: For the following:
  - 1. Metal nosings.
- B. Shop Drawings: Show fabrication and installation details. Provide Shop Drawings for the following:
  - 1. Abrasive metal nosings.
- C. Samples for Verification: For each type and finish of extruded nosing.

1.5 FIELD CONDITIONS

- A. Field Measurements: Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication.



**Project P-5705BB**  
**PART 2 - PRODUCTS**

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## 2.1 PERFORMANCE REQUIREMENTS

- A. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on exterior metal fabrications by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.
  - 1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

## 2.2 METALS

- A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.
- B. Aluminum Extrusions: ASTM B 221, Alloy 6063-T6.
- C. Aluminum-Alloy Rolled Tread Plate: ASTM B 632/B 632M, Alloy 6061-T6.

## 2.3 FABRICATION, GENERAL

- A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.
- B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- C. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- D. Form exposed work with accurate angles and surfaces and straight edges.
- E. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners or welds where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) fasteners unless otherwise indicated. Locate joints where least conspicuous.
- F. Fabricate seams and other connections that are exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.
- G. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.
- H. Provide for anchorage of type indicated; coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.

**Project P-5705BB****ARC-4****Mecklenburg County****2.4 ABRASIVE METAL NOSINGS**

- A. Extruded Units: Aluminum, with abrasive filler consisting of aluminum oxide, silicon carbide, or a combination of both, in an epoxy-resin binder. Fabricate units in lengths necessary to accurately fit openings or conditions.
  - 1. Basis-of-Design Product: American Safety Tread 3511 or approved equal.
  - 2. Provide ribbed units, with abrasive filler strips projecting 1/16 inch above aluminum extrusion.
  - 3. Nosings: Square-back units, 3 inches wide, for casting into concrete steps.
- B. Provide anchors for embedding units in concrete, either integral or applied to units, as standard with manufacturer.
- C. Apply clear lacquer to concealed surfaces of extruded units.

**2.5 FINISHES, GENERAL**

- A. Finish metal fabrications after assembly.
- B. Finish exposed surfaces to remove tool and die marks and stretch lines, and to blend into surrounding surface.

**2.6 ALUMINUM FINISHES**

- A. As-Fabricated Finish: AA-M12.

**PART 3 - EXECUTION****3.1 INSTALLATION, GENERAL**

- A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.
- B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.
- C. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag screws, wood screws, and other connectors.
- D. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.

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- E. Corrosion Protection: Coat concealed surfaces of aluminum that come into contact with grout, concrete, masonry, wood, or dissimilar metals with the following:
  - 1. Extruded Aluminum: Two coats of clear lacquer.

3.2 INSTALLING NOSINGS, TREADS, AND THRESHOLDS

- A. Center nosings on tread widths unless otherwise indicated.
- B. For nosings embedded in concrete steps or curbs, align nosings flush with riser faces and level with tread surfaces.

PART 4 - BASIS OF PAYMENT

- 4.1 The quantity of abrasive metal nosings will be paid for at the contract unit price bid per linear foot for "Abrasive Metal Nosings".
- 4.2 The unit price bid per linear foot will be full compensation for all work covered by this Special Provision including, but not limited to, surface preparation, furnishing and placing abrasive metal nosings.
- 4.3 Payment will be made under:

Abrasive Metal Nosings      Linear Foot

END OF SECTION 055000

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SECTION 057000 - DECORATIVE METAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

- 1. Stainless Steel Enclosure
- 2. Stainless Steel Gates

B. Related Requirements:

- 1. Section 057300 "Metal Railings" for metal railings.

1.3 COORDINATION

- A. Coordinate installation of anchorages for decorative metal items. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product, including finishing materials.

- 1. Gates and hardware.
- 2. Fence and gate posts, rails, and fittings.

B. Shop Drawings: Show fabrication and installation details for decorative metal.

- 1. Include plans, elevations, component details, and attachment details.
- 2. Indicate materials and profiles of each decorative metal member, fittings, joinery, finishes, fasteners, anchorages, and accessory items.
- 3. Include accessories, hardware, gate operation, and operational clearances.

C. Samples for Initial Selection: For products involving selection of color, texture, or design.

D. Samples for Verification: For each type of exposed finish.

- 1. Sections of linear shapes.
- 2. Full-size Samples of castings and forgings.

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3. Samples of welded joints showing quality of workmanship.

E. Delegated-Design Submittal: For installed products indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For fabricator.

B. Welding certificates.

1.6 QUALITY ASSURANCE

A. Fabricator Qualifications: A firm experienced in producing decorative metal similar to that indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

B. Installer Qualifications: Fabricator of products.

C. Welding Qualifications: Qualify procedures and personnel according to the following:

1. AWS D1.6/D1.6M, "Structural Welding Code - Stainless Steel."

D. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for fabrication and installation.

1. Build mockups for the following types of decorative metal:

a. Gates and enclosure.

2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store decorative metal in a well-ventilated area, away from uncured concrete and masonry, and protected from weather, moisture, soiling, abrasion, extreme temperatures, and humidity.

1.8 FIELD CONDITIONS

A. Field Measurements: Verify actual locations of walls and other construction contiguous with decorative metal by field measurements before fabrication and indicate measurements on Shop Drawings.

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## 1.9 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of fences and gates that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Failure to comply with performance requirements.
    - b. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
  - 2. Warranty Period: Five years from date of Substantial Completion.

## PART 2 - PRODUCTS

## 2.1 DECORATIVE METAL FABRICATORS

- A. Source Limitations: Obtain each type of decorative metal from single source from single manufacturer.
- B. Product Options: Information on Drawings and in Specifications establishes requirements for system's aesthetic effects and performance characteristics. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction. Performance characteristics are indicated by criteria subject to verification by one or more methods, including structural analysis, preconstruction testing, field testing, and in-service performance.
  - 1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.

## 2.2 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer to design enclosure and gates, including attachment to building construction.
- B. Structural Performance: Comply with wind load requirements per North Carolina Building Code. Enclosure and gates shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
  - 1. Handrails and Top Rails of Guards:
    - a. Uniform load of 50 lbf/ft. applied in any direction.
    - b. Concentrated load of 200 lbf applied in any direction.
    - c. Uniform and concentrated loads need not be assumed to act concurrently.
  - 2. Infill of Guards:
    - a. Concentrated load of 50 lbf applied horizontally on an area of 1 sq. ft.

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b. Infill load and other loads need not be assumed to act concurrently.

C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on decorative metal by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.

1. Temperature Change: 120 deg F, ambient; 180 deg F material surfaces.

### 2.3 METALS, GENERAL

A. Metal Surfaces, General: Use materials with smooth, flat surfaces unless otherwise indicated. Use materials without seam marks, roller marks, rolled trade names, stains, discolorations, or blemishes.

### 2.4 STAINLESS STEEL

A. Tubing: ASTM A 554, Grade MT 316.

B. Pipe: ASTM A 312/A 312M, Grade TP 316.

C. Castings: ASTM A 743/A 743M, Grade CF 8 or CF 20.

D. Sheet, Strip, Plate, and Flat Bar: ASTM A 666, Type 316.

E. Bars and Shapes: ASTM A 276, Type 316.

F. Perforated Metal: Stainless-steel sheet, ASTM A 240/A 240M or ASTM A 666, Type 316, 12ga.

1. Basis-of-Design Product: Provide product with perforations matching Ametco Slotted, 1/4" x 13/16" slots.

### 2.5 FASTENERS

A. Fastener Materials: Unless otherwise indicated, provide the following:

1. Stainless-Steel Items: Type 316 stainless-steel fasteners.
2. Dissimilar Metals: Type 316 stainless-steel fasteners.

B. Fasteners for Anchoring to Other Construction: Unless otherwise indicated, select fasteners of type, grade, and class required to produce connections suitable for anchoring indicated items to other types of construction indicated.

C. Provide concealed fasteners for interconnecting components and for attaching decorative metal items to other work unless otherwise indicated.

1. Provide temper-resistant flat-head machine screws for exposed fasteners unless otherwise indicated.

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- D. Post-Installed Anchors: Fastener systems with working capacity greater than or equal to the design load, according to an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC193.
  - 1. Material for Exterior Locations and Where Stainless Steel Is Indicated: Alloy Group 1 stainless-steel bolts, ASTM F 593, and nuts, ASTM F 594.

**2.6 MISCELLANEOUS MATERIALS**

- A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.
  - 1. For stainless-steel railings, provide type and alloy as recommended by producer of metal to be welded and as required for color match, strength, and compatibility in fabricated items.

**2.7 FABRICATION, GENERAL**

- A. Assemble items in the shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation. Use connections that maintain structural value of joined pieces.
- B. Form decorative metal to required shapes and sizes, true to line and level with true curves and accurate angles and surfaces. Finish exposed surfaces to smooth, sharp, well-defined lines and arris.
- C. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing the Work.
- D. Form simple and compound curves in bars, pipe, tubing, and extruded shapes by bending members in jigs to produce uniform curvature for each configuration required; maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces.
- E. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- F. Mill joints to a tight, hairline fit. Cope or miter corner joints. Fabricate connections that will be exposed to weather in a manner to exclude water.
- G. Provide weep holes where water may accumulate. Locate weep holes in inconspicuous locations.
- H. Provide necessary rebates, lugs, and brackets to assemble units and to attach to other work. Cut, reinforce, drill, and tap as needed to receive finish hardware, screws, and similar items unless otherwise indicated.



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- I. Comply with AWS for recommended practices in shop welding. Weld behind finished surfaces without distorting or discoloring exposed side. Clean exposed welded joints of flux, and dress exposed and contact surfaces.
  - 1. Where welding cannot be concealed behind finished surfaces, finish joints to comply with NOMMA's "Voluntary Joint Finish Standards" for Type 1 Welds: no evidence of a welded joint.
- J. Perforated-Metal Infill Panels: Fabricate infill panels from perforated metal made from stainless steel.
  - 1. Orient perforated metal with pattern horizontal.

**2.8 STAINLESS STEEL ENCLOSURE AND GATES**

- A. General: Fabricate stainless steel enclosure and gates to designs indicated from steel bars and shapes of sizes and profiles indicated. Form steel bars by bending, forging, coping, mitering, and welding.
- B. Welding: Interconnect enclosure and gate members with full-length, full-penetration welds unless otherwise indicated. Use welding method that is appropriate for metal and finish indicated and that develops full strength of members joined. Finish exposed welds and surfaces smooth, flush, and blended to match adjoining surfaces.
- C. Brackets, Fittings, and Anchors: Provide wall brackets, fittings, and anchors to connect stainless steel enclosure and gates to other work unless otherwise indicated.
  - 1. Furnish inserts and other anchorage devices to connect stainless steel enclosure to concrete and masonry work. Coordinate anchorage devices with supporting structure.
  - 2. Fabricate anchorage devices that are capable of withstanding loads indicated.
- D. Install hardware as indicated.

**2.9 FINISHES, GENERAL**

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

**2.10 STAINLESS-STEEL FINISHES**

- A. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.
- B. Polished Finishes: Grind and polish surfaces to produce uniform finish, free of cross scratches.
  - 1. Run grain of directional finishes with long dimension of each piece.
- C. Directional Satin Finish: No. 4.

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- D. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.

**PART 3 - EXECUTION****3.1 EXAMINATION**

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of decorative metal.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

**3.2 INSTALLATION, GENERAL**

- A. Provide anchorage devices and fasteners where needed to secure decorative metal to in-place construction.
- B. Perform cutting, drilling, and fitting required to install decorative metal. Set products accurately in location, alignment, and elevation, measured from established lines and levels. Provide temporary bracing or anchors in formwork for items to be built into concrete, masonry, or similar construction.
- C. Fit exposed connections accurately together to form tight, hairline joints or, where indicated, uniform reveals and spaces for sealants and joint fillers. Where cutting, welding, and grinding are required for proper shop fitting and jointing of decorative metal, restore finishes to eliminate evidence of such corrective work.
- D. Do not cut or abrade finishes that cannot be completely restored in the field. Return items with such finishes to the shop for required alterations, followed by complete refinishing, or provide new units as required.
- E. Install concealed gaskets, joint fillers, insulation, and flashings as work progresses.
- F. Restore protective coverings that have been damaged during shipment or installation. Remove protective coverings only when there is no possibility of damage from other work yet to be performed at same location.
  - 1. Retain protective coverings intact; remove coverings simultaneously from similarly finished items to preclude nonuniform oxidation and discoloration.
- G. Field Welding: Comply with applicable AWS specification for procedures of manual shielded metal arc welding and requirements for welding and for finishing welded connections in "Fabrication, General" Article. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations.
- H. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.

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**3.3 CLEANING AND PROTECTION**

- A. Unless otherwise indicated, clean metals by washing thoroughly with clean water and soap, rinsing with clean water, and drying with soft cloths.
- B. Restore finishes damaged during installation and construction period so no evidence remains of correction work. Return items that cannot be refinished in the field to the shop; make required alterations and refinish entire unit, or provide new units.

**PART 4 - BASIS OF PAYMENT**

**4.1 Stainless Steel Enclosure**

- A. The quantity of stainless steel enclosure will be paid for at the contract unit price bid per square foot for “Stainless Steel Enclosure”.
- B. The unit price bid per square foot will be full compensation for all work covered by this Special Provision including, but not limited to, surface preparation, furnishing and placing stainless steel enclosure.
- C. Payment will be made under:

Stainless Steel Enclosure	Square Foot
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**4.2 Stainless Steel Gates**

- A. The quantity of stainless steel gates will be paid for at the contract unit price bid per each pair of gates for “Stainless Steel Gates”.
- B. The unit price bid per each pair of gates will be full compensation for all work covered by this Special Provision including, but not limited to, surface preparation, furnishing and placing stainless steel gates.
- C. Payment will be made under:

8’-0” Stainless Steel Gates	Each Pair
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3’-6” Stainless Steel Gates	Each Pair
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END OF SECTION 057000

**Project P-5705BB**  
SECTION 057300 - METAL RAILINGS

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## PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

### 1.2 SUMMARY

- A. Section Includes:
  - 1. Stainless-steel railings and handrails.

### 1.3 DEFINITIONS

- A. Railings: Guards, handrails, and similar devices used for protection of occupants at open-sided floor areas and for pedestrian guidance and support, visual separation, or wall protection.

### 1.4 COORDINATION AND SCHEDULING

- A. Coordinate installation of anchorages for railings. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver items to Project site in time for installation.
- B. Schedule installation so wall attachments are made only to completed walls. Do not support railings temporarily by any means that do not meet structural performance requirements.

### 1.5 ACTION SUBMITTALS

- A. Product Data: For the following:
  - 1. Manufacturer's product lines of railings assembled from standard components.
  - 2. Grout, anchoring cement, and paint products.
- B. Shop Drawings: Include plans, elevations, sections, and attachment details.
- C. Samples for Initial Selection: For products involving selection of color, texture, or design.
- D. Samples for Verification: For each type of exposed finish required.
  - 1. Sections of each distinctly different linear railing member, including handrails, top rails, posts, and balusters.
  - 2. Fittings and brackets.
  - 3. Welded connections.

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4. Assembled Samples of railing systems, made from full-size components, including top rail, post, handrail, and infill. Show method of finishing members at intersections. Samples need not be full height.
- E. Delegated-Design Submittal: For installed products indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

**1.6 INFORMATIONAL SUBMITTALS**

- A. Welding certificates.
- B. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, according to ASTM E 894 and ASTM E 935.
- C. Evaluation Reports: For post-installed anchors, from ICC-ES.

**1.7 QUALITY ASSURANCE**

- A. Welding Qualifications: Qualify procedures and personnel according to the following:
  1. AWS D1.6/D1.6M, "Structural Welding Code - Stainless Steel."
- B. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for fabrication and installation.
  1. Build mockups for each form and finish of railing consisting of two posts, top rail, infill area, and anchorage system components that are full height and are not less than 24 inches in length.
  2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

**1.8 FIELD CONDITIONS**

- A. Field Measurements: Verify actual locations of walls and other construction contiguous with railings by field measurements before fabrication and indicate measurements on Shop Drawings.

**PART 2 - PRODUCTS****2.1 MANUFACTURERS**

- A. Source Limitations: Obtain each type of railing from single source from single manufacturer.
- B. Product Options: Information on Drawings and in Specifications establishes requirements for system's aesthetic effects and performance characteristics. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction. Performance characteristics are

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indicated by criteria subject to verification by one or more methods, including structural analysis, preconstruction testing, field testing, and in-service performance.

1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.

**2.2 PERFORMANCE REQUIREMENTS**

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design railings, including attachment to building construction.
- B. General: In engineering railings to withstand structural loads indicated, determine allowable design working stresses of railing materials based on the following:
  1. Stainless Steel: 60 percent of minimum yield strength.
- C. Structural Performance: Railings, including attachment to building construction, shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
  1. Handrails and Top Rails of Guards:
    - a. Uniform load of 50 lbf/ft. applied in any direction.
    - b. Concentrated load of 200 lbf applied in any direction.
    - c. Uniform and concentrated loads need not be assumed to act concurrently.
  2. Infill of Guards:
    - a. Concentrated load of 50 lbf applied horizontally on an area of 1 sq. ft.
    - b. Infill load and other loads need not be assumed to act concurrently.
- D. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on exterior railings by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.
  1. Temperature Change: 120 deg F, ambient; 180 deg F material surfaces.

**2.3 METALS, GENERAL**

- A. Metal Surfaces, General: Provide materials with smooth surfaces, without seam marks, roller marks, rolled trade names, stains, discolorations, or blemishes.
- B. Brackets, Flanges, and Anchors: Same metal and finish as supported rails unless otherwise indicated.
  1. Provide either formed- or cast-metal brackets with predrilled hole for exposed bolt anchorage.

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- A. Tubing: ASTM A 554, Grade MT 316.
- B. Pipe: ASTM A 312/A 312M, Grade TP 316.
- C. Castings: ASTM A 743/A 743M, Grade CF 8 or CF 20.
- D. Sheet, Strip, Plate, and Flat Bar: ASTM A 666, Type 316.
- E. Bars and Shapes: ASTM A 276, Type 316.
- F. Perforated Metal: Stainless-steel sheet, ASTM A 240/A 240M or ASTM A 666, Type 316, 12ga.
  - 1. Basis-of-Design Product: Provide product with perforations matching Ametco Slotted, 1/4" x 13/16" slots.

**2.5 FASTENERS**

- A. Fastener Materials: Unless otherwise indicated, provide the following:
  - 1. Stainless-Steel Components: Type 316 stainless-steel fasteners.
  - 2. Dissimilar Metals: Type 316 stainless-steel fasteners.
- B. Fasteners for Anchoring to Other Construction: Select fasteners of type, grade, and class required to produce connections suitable for anchoring railings to other types of construction indicated and capable of withstanding design loads.
- C. Provide concealed fasteners for interconnecting railing components and for attaching railings to other work unless otherwise indicated.
  - 1. Provide tamper-resistant flat-head machine screws for exposed fasteners unless otherwise indicated.
- D. Post-Installed Anchors: Fastener systems with working capacity greater than or equal to the design load, according to an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC193.
  - 1. Material for Exterior Locations and Where Stainless Steel Is Indicated: Alloy Group 1 stainless-steel bolts, ASTM F 593, and nuts, ASTM F 594.

**2.6 MISCELLANEOUS MATERIALS**

- A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.
  - 1. For stainless-steel railings, provide type and alloy as recommended by producer of metal to be welded and as required for color match, strength, and compatibility in fabricated items.

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- B. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107/C 1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.

**2.7 FABRICATION**

- A. General: Fabricate railings to comply with requirements indicated for design, dimensions, member sizes and spacing, details, finish, and anchorage, but not less than that required to support structural loads.
- B. Assemble railings in the shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation. Use connections that maintain structural value of joined pieces.
- C. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- D. Form work true to line and level with accurate angles and surfaces.
- E. Fabricate connections that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate. Locate weep holes in inconspicuous locations.
- F. Cut, reinforce, drill, and tap as indicated to receive finish hardware, screws, and similar items.
- G. Connections: Fabricate railings with welded connections unless otherwise indicated.
- H. Welded Connections: Cope components at connections to provide close fit, or use fittings designed for this purpose. Weld all around at connections, including at fittings.
  - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
  - 2. Obtain fusion without undercut or overlap.
  - 3. Remove flux immediately.
  - 4. At exposed connections, finish exposed welds to comply with NOMMA's "Voluntary Joint Finish Standards" for Type 1 welds; no evidence of a welded joint.
- I. Form changes in direction as follows:
  - 1. By radius bends of radius indicated or by inserting prefabricated elbow fittings of radius indicated.
- J. Bend members in jigs to produce uniform curvature for each configuration required; maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of components.
- K. Close exposed ends of hollow railing members with prefabricated end fittings.
- L. Provide wall returns at ends of wall-mounted handrails unless otherwise indicated. Close ends of returns, unless clearance between end of rail and wall is 1/4 inch or less.



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- M. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, flanges, miscellaneous fittings, and anchors to interconnect railing members to other work unless otherwise indicated.
- N. Provide inserts and other anchorage devices for connecting railings to concrete or masonry work. Fabricate anchorage devices capable of withstanding loads imposed by railings. Coordinate anchorage devices with supporting structure.
- O. Perforated-Metal Infill Panels: Fabricate infill panels from perforated metal made from stainless steel.
  - 1. Orient perforated metal with pattern horizontal.

**2.8 GENERAL FINISH REQUIREMENTS**

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipment.
- C. Provide exposed fasteners with finish matching appearance, including color and texture, of railings.

**2.9 STAINLESS-STEEL FINISHES**

- A. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.
- B. Polished Finishes: Grind and polish surfaces to produce uniform finish, free of cross scratches.
  - 1. Run grain of directional finishes with long dimension of each piece.
- C. Directional Satin Finish: No. 4.
- D. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.

**PART 3 - EXECUTION****3.1 INSTALLATION, GENERAL**

- A. Fit exposed connections together to form tight, hairline joints.
- B. Perform cutting, drilling, and fitting required for installing railings. Set railings accurately in location, alignment, and elevation; measured from established lines and levels and free of rack.
  - 1. Do not weld, cut, or abrade surfaces of railing components that have been coated or finished after fabrication and that are intended for field connection by mechanical or other means without further cutting or fitting.
  - 2. Set posts plumb within a tolerance of 1/16 inch in 3 feet.

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3. Align rails so variations from level for horizontal members and variations from parallel with rake of steps and ramps for sloping members do not exceed 1/4 inch in 12 feet.
- C. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.
- D. Adjust railings before anchoring to ensure matching alignment at abutting joints.
- E. Fastening to In-Place Construction: Use anchorage devices and fasteners where necessary for securing railings and for properly transferring loads to in-place construction.

**3.2 RAILING CONNECTIONS**

- A. Welded Connections: Use fully welded joints for permanently connecting railing components. Comply with requirements for welded connections in "Fabrication" Article whether welding is performed in the shop or in the field.
- B. Expansion Joints: Install expansion joints at locations indicated but not farther apart than required to accommodate thermal movement. Provide slip-joint internal sleeve extending 2 inches beyond joint on either side, fasten internal sleeve securely to one side, and locate joint within 6 inches of post.

**3.3 ANCHORING POSTS**

- A. Anchor posts to metal surfaces with flanges, angle type, or floor type as required by conditions, connected to posts and to metal supporting members as follows:
  1. For stainless-steel railings, weld flanges to posts and bolt to metal-supporting surfaces.

**3.4 ATTACHING RAILINGS**

- A. Attach handrails to walls with wall brackets. Provide brackets with 1-1/2-inch clearance from inside face of handrail and finished wall surface. Locate brackets as indicated or, if not indicated, at spacing required to support structural loads.
  1. Use type of bracket with predrilled hole for exposed bolt anchorage.
  2. Locate brackets as indicated or, if not indicated, at spacing required to support structural loads.
- B. Secure wall brackets to building construction as follows:
  1. For concrete and solid masonry anchorage, use drilled-in expansion shields and hanger or lag bolts.

**3.5 CLEANING**

- A. Clean aluminum and stainless steel by washing thoroughly with clean water and soap, rinsing with clean water, and wiping dry.

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3.6 PROTECTION

- A. Protect finishes of railings from damage during construction period with temporary protective coverings approved by railing manufacturer. Remove protective coverings at time of Substantial Completion.
- B. Restore finishes damaged during installation and construction period so no evidence remains of correction work. Return items that cannot be refinished in the field to the shop; make required alterations and refinish entire unit, or provide new units.

PART 4 - BASIS OF PAYMENT

4.1 Stainless Steel Railings

- A. The quantity of stainless steel railings will be paid for at the contract unit price bid per linear foot for "Stainless Steel Railings".
- B. The unit price bid per linear foot will be full compensation for all work covered by this Special Provision including, but not limited to, surface preparation, furnishing and placing stainless steel railings.
- C. Payment will be made under:

Stainless Steel Railings	Linear Foot
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4.2 Stainless Steel Handrails

- A. The quantity of stainless steel handrails will be paid for at the contract unit price bid per linear foot for "Stainless Steel Handrails".
- B. The unit price bid per linear foot will be full compensation for all work covered by this Special Provision including, but not limited to, surface preparation, furnishing and placing stainless steel handrails.
- C. Payment will be made under:

Stainless Steel Handrails	Linear Foot
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END OF SECTION 057300

**Project P-5705BB**  
SECTION 061063 – RUB RAIL

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**Mecklenburg County**

## PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

### 1.2 SUMMARY

- A. Section Includes:
  - 1. Platform rub rail.
- B. Related Requirements:

### 1.3 DEFINITIONS

- A. Dimension Lumber: Lumber of 2 inches nominal or greater but less than 5 inches nominal in least dimension.
- B. Lumber grading agencies, and the abbreviations used to reference them, include the following:
  - 1. SPIB: The Southern Pine Inspection Bureau.
  - 2. WCLIB: West Coast Lumber Inspection Bureau.
  - 3. WWPA: Western Wood Products Association.
- C. Preservative Treatment: American Wood Preservers' Association (AWPA) and American Wood Preservers Bureau (AWPB) standards. AWPA C20 Fire Retardant Treatment by Pressure Process.

### 1.4 ACTION SUBMITTALS

- A. Product Data: For preservative-treated wood products. Include chemical treatment manufacturer's written instructions for handling, storing, installing, and finishing treated material.

### 1.5 INFORMATIONAL SUBMITTALS

- A. Material Certificates:
  - 1. For preservative-treated wood products. Indicate type of preservative used and net amount of preservative retained.
- B. Certificates of Inspection: Issued by lumber grading agency for exposed wood products not marked with grade stamp.

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- C. Evaluation Reports: For preservative-treated wood products, from ICC-ES.

## 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store materials under cover and protected from weather and contact with damp or wet surfaces. Stack lumber flat with spacers between each bundle to provide air circulation. Provide for air circulation around stacks and under coverings.

## PART 2 - PRODUCTS

## 2.1 LUMBER, GENERAL

- A. Comply with DOC PS 20 and with grading rules of lumber grading agencies certified by ALSC's Board of Review as applicable. If no grading agency is indicated, comply with the applicable rules of any rules-writing agency certified by ALSC's Board of Review.
  - 1. Factory mark each item with grade stamp of grading agency.
  - 2. For items that are exposed to view in the completed Work, mark grade stamp on end or back of each piece.
  - 3. Where nominal sizes are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry wood products.
  - 4. Provide dressed lumber, S4S, unless otherwise indicated.
- B. Maximum Moisture Content:
  - 1. Dimension Lumber: 19 percent for more than 2-inch nominal thickness

## 2.2 LUMBER

- A. Dimension Lumber: No. 1 grade and any of the following species:
  - 1. Hem-fir or hem-fir (North); NLGA, WCLIB, or WWPA.
  - 2. Douglas fir-larch, Douglas fir-larch (North), or Douglas fir-south; NLGA, WCLIB, or WWPA.
  - 3. Mixed southern pine; SPIB.

## 2.3 PRESERVATIVE TREATMENT

- A. Pressure treat boards and dimension lumber with waterborne preservative according to AWWA U1; Use Category UC3b for exterior construction not in contact with the ground, and Use Category UC4a for items in contact with the ground.
- B. Preservative Chemicals: Acceptable to authorities having jurisdiction.
  - 1. Do not use chemicals containing arsenic or chromium .
- C. Use process that includes water-repellent treatment.

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- D. After treatment, redry dimension lumber to 19 percent maximum moisture content.
- E. Mark treated wood with treatment quality mark of an inspection agency approved by ALSC's Board of Review.
  - 1. For items indicated to receive a stained or natural finish, mark each piece on surface that will not be exposed.
- F. Application: Treat all wood unless otherwise indicated.

**2.4 FASTENERS**

- A. General: Provide fasteners of size and type indicated, acceptable to authorities having jurisdiction, and that comply with requirements specified in this article for material and manufacture. Provide nails or screws, in sufficient length.
  - 1. Use stainless steel unless otherwise indicated.
  - 2. For pressure-preservative-treated wood, use stainless-steel fasteners.
- B. Nails: ASTM F 1667.
- C. Power-Driven Fasteners: ICC-ES AC70.
- D. Wood Screws and Lag Screws: ASME B18.2.1, ASME B18.6.1, or ICC-ES AC233.
- E. Stainless-Steel Bolts: ASTM F 593, Alloy Group 1 or 2; with ASTM F 594, Alloy Group 1 or 2 hex nuts and, where indicated, flat washers.

**PART 3 - EXECUTION****3.1 INSTALLATION, GENERAL**

- A. Set work to required levels and lines, with members plumb, true to line, cut, and fitted. Fit work to other construction; scribe and cope as needed for accurate fit.
- B. Do not splice structural members between supports unless otherwise indicated.
- C. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.
- D. Sort and select lumber so that natural characteristics do not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of members or pieces that are too small to use with minimum number of joints or optimum joint arrangement.
- E. Apply copper naphthenate field treatment to comply with AWPAC M4, to cut surfaces of preservative-treated lumber.

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- F. Securely attach exterior rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
  - 1. ICC-ES AC70 for power-driven fasteners.
  - 2. "Fastening Schedule" in ICC's International Building Code.
  
- G. Use common wire nails unless otherwise indicated. Select fasteners of size that do not fully penetrate members where opposite side is exposed to view. Make tight connections between members. Install fasteners without splitting wood; do not countersink nail heads unless otherwise indicated.

**PART 4 - BASIS OF PAYMENT**

- 4.1 The quantity of rub rail will be paid for at the contract unit price bid per linear foot for "Rub Rail".
  
- 4.2 The unit price bid per linear foot will be full compensation for all work covered by this Special Provision including, but not limited to, surface preparation, furnishing and placing rub rail. The linear foot quantity includes (2) 3x10 boards and fasteners.
  
- 4.3 Payment will be made under:

Rub Rail	Linear Foot
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END OF SECTION 061063

**Project P-5705BB**  
SECTION 079500 – EXPANSION CONTROL

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## PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

### 1.2 SUMMARY

- A. Section Includes:
  - 1. Parking and open-air structure expansion joint cover assemblies.

### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
  - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for expansion joint cover assemblies.
- B. Shop Drawings: For each expansion joint cover assembly.
  - 1. Include plans, elevations, sections, details, splices, block-out requirement, attachments to other work, and line diagrams showing entire route of each expansion joint.
- C. Samples for Initial Selection: For each type of exposed finish.
  - 1. Include manufacturer's color charts showing the full range of colors and finishes available for each exposed metal and elastomeric seal material.
- D. Samples for Verification: For each type of expansion joint cover assembly, full width by 6 inches long in size.

## PART 2 - PRODUCTS

### 2.1 ASSEMBLY DESCRIPTION

- A. Furnish units in longest practicable lengths to minimize field splicing.
- B. Include factory-fabricated closure materials and transition pieces, T-joints, corners, curbs, cross-connections, and other accessories as required to provide continuous expansion joint cover assemblies.



**Project P-5705BB****ARC-27****Mecklenburg County****2.2 EXPANSION JOINT COVERS**

- A. Source Limitations: Obtain expansion control systems from single source from single manufacturer.
- B. Bolt-In Parking Deck Joint Cover: Assembly consisting of winged elastomeric seal locked into slab-edge block outs by metal frames bolted to slab. Fully grout block outs with elastomeric concrete.
  - 1. Basis-of-Design Product: Nystrom PTX-200 or approved equal.
  - 2. Application: Slab to slab.
  - 3. Installation: Recessed.
  - 4. Design Criteria:
    - a. Nominal Joint Width: As indicated on Drawings.
    - b. Minimum Joint Width: As indicated on Drawings.
    - c. Maximum Joint Width: As indicated on Drawings.
    - d. Movement Capability: +/-50%
    - e. Type of Movement: As indicated on Drawings
    - f. Load Capacity:
      - 1) Uniform Load: 200 lb/sq. ft.
      - 2) Concentrated Load: 2000 lb
      - 3) Maximum Deflection: 0.125 inch
  - 5. Cover-Plate Design: Abrasive covered.
  - 6. Exposed Metal:
    - a. Stainless steel: Manufacturer's standard.
  - 7. Seal: Preformed elastomeric extrusion.
    - a. Color: As selected by Architect from manufacturer's full range.

**2.3 MATERIALS**

- A. Stainless Steel: ASTM A 240/A 240M or ASTM A 666, Type 304 for plates, sheet, and strips.
  - 1. Remove tool and die marks and stretch lines or blend into finish.
- B. Elastomeric Concrete: Modified epoxy or polyurethane extended into a prepackaged aggregate blend, specifically designed for bonding to concrete substrates.
- C. Moisture Barriers: Manufacturer's standard continuous, waterproof membrane within joint and attached to substrate on sides of joint.
- D. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107/C 1107M, factory-packaged, nonmetallic aggregate grout, noncorrosive, nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.
- E. Manufacturer's stainless-steel attachment devices. Include anchors, clips, fasteners, set screws, spacers, and other accessories compatible with material in contact, as indicated or required for complete installations.

**Project P-5705BB****ARC-28****Mecklenburg County****2.4 GENERAL FINISH REQUIREMENTS**

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

**2.5 STAINLESS-STEEL FINISHES**

- A. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.
- B. Polished Finishes: Grind and polish surfaces to produce uniform finish, free of cross scratches.

**PART 3 - EXECUTION****3.1 EXAMINATION**

- A. Examine surfaces where expansion control systems will be installed for installation tolerances and other conditions affecting performance of work.
  - 1. Proceed with installation only after unsatisfactory conditions have been corrected.

**3.2 PREPARATION**

- A. Prepare substrates according to expansion control system manufacturer's written instructions.
- B. Coordinate and furnish anchorages, setting drawings, and instructions for installing expansion control systems. Provide fasteners of metal, type, and size to suit type of construction indicated and to provide for secure attachment of expansion control systems.

**3.3 INSTALLATION**

- A. Comply with manufacturer's written instructions for storing, handling, and installing expansion control systems and materials unless more stringent requirements are indicated.
- B. Metal Frames: Perform cutting, drilling, and fitting required to install expansion joint cover assemblies.
  - 1. Repair or grout block out as required for continuous frame support, using nonmetallic, shrinkage-resistant grout.
  - 2. Install frames in continuous contact with adjacent surfaces.

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- a. Shimming is not permitted.
  3. Install in true alignment and proper relationship to joints and adjoining finished surfaces measured from established lines and levels.
  4. Adjust for differences between actual structural gap and nominal design gap due to ambient temperature at time of installation.
  5. Cut and fit ends to accommodate thermal expansion and contraction of metal without buckling of frames.
  6. Locate anchors at interval recommended by manufacturer, but not less than 3 inches from each end and not more than 24 inches o.c.
- C. Seals: Install elastomeric seals and membranes in frames to comply with manufacturer's written instructions. Install with minimum number of end joints.
1. Provide in continuous lengths for straight sections.
  2. Seal transitions. Vulcanize or heat-weld field-spliced joints as recommended by manufacturer.
  3. Installation: Mechanically lock seals into frames or adhere to frames with adhesive or pressure-sensitive tape as recommended by manufacturer.
- D. Install with hairline mitered corners where expansion joint cover assemblies change direction or abut other materials.
- E. Terminate exposed ends of expansion control systems with field- or factory-fabricated termination devices.
- F. Elastomeric Concrete: Install according to manufacturer's written application instructions.
- 3.4 PROTECTION
- A. Do not remove protective covering until finish work in adjacent areas is complete. When protective covering is removed, clean exposed metal surfaces to comply with manufacturer's written instructions.
  - B. Protect the installation from damage by work of other Sections. Where necessary due to heavy construction traffic, remove and properly store cover plates or seals and install temporary protection over expansion control systems. Reinstall cover plates or seals prior to Substantial Completion of the Work.

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**PART 4 - BASIS OF PAYMENT**

- 4.1 The quantity of platform expansion joints will be paid for at the contract unit price bid per linear foot for "Platform Expansion Joints".
  
- 4.2 The unit price bid per linear foot will be full compensation for all work covered by this Special Provision including, but not limited to, surface preparation, furnishing and placing platform expansion joints.
  
- 4.3 Payment will be made under:

Platform Expansion Joints	Linear Foot
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END OF SECTION 079500

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## SECTION 087100 - DOOR HARDWARE

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

## 1.2 SUMMARY

- A. Section includes:
  - 1. Mechanical door hardware for the following:
    - a. Swinging gates.
- B. Related Sections:

## 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction and installation details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Samples for Verification: For exposed door hardware of each type required, in each finish specified, prepared on Samples of size indicated below. Tag Samples with full description for coordination with the door hardware schedule. Submit Samples before, or concurrent with, submission of door hardware schedule.
  - 1. Sample Size: Full-size units or minimum 2-by-4-inch Samples for sheet and 4-inch long Samples for other products.
    - a. Full-size Samples will be returned to Contractor. Units that are acceptable and remain undamaged through submittal, review, and field comparison process may, after final check of operation, be incorporated into the Work, within limitations of keying requirements.
- C. Other Action Submittals:
  - 1. Door Hardware Schedule: Prepared by or under the supervision of Installer, detailing fabrication and assembly of door hardware, as well as installation procedures and diagrams. Coordinate final door hardware schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
    - a. Submittal Sequence: Submit door hardware schedule concurrent with submissions of Product Data, Samples, and Shop Drawings. Coordinate submission of door

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hardware schedule with scheduling requirements of other work to facilitate the fabrication of other work that is critical in Project construction schedule.

- b. Format: Use same scheduling sequence and format and use same door numbers as in the Contract Documents.
  - c. Content: Include the following information:
    - 1) Identification number, location, hand, fire rating, size, and material of each door and frame.
    - 2) Locations of each door hardware set, cross-referenced to Drawings on floor plans and to door and frame schedule.
    - 3) Complete designations, including name and manufacturer, type, style, function, size, quantity, function, and finish of each door hardware product.
    - 4) Fastenings and other pertinent information.
    - 5) Explanation of abbreviations, symbols, and codes contained in schedule.
    - 6) Mounting locations for door hardware.
    - 7) List of related door devices specified in other Sections for each door and frame.
2. Keying Schedule: Prepared by or under the supervision of Installer, detailing Owner's final keying instructions for locks. Include schematic keying diagram and index each key set to unique door designations that are coordinated with the Contract Documents.

**1.4 INFORMATIONAL SUBMITTALS**

- A. Qualification Data: For Installer and Architectural Hardware Consultant.
- B. Product Test Reports: For compliance with accessibility requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for door hardware on doors located in accessible routes.
- C. Warranty: Special warranty specified in this Section.

**1.5 CLOSEOUT SUBMITTALS**

- A. Maintenance Data: For each type of door hardware to include in maintenance manuals. Include final hardware and keying schedule.

**1.6 QUALITY ASSURANCE**

- A. Installer Qualifications: Supplier of products and an employer of workers trained and approved by product manufacturers and an Architectural Hardware Consultant who is available during the course of the Work to consult with Contractor, Architect, and Owner about door hardware and keying.
  - 1. Warehousing Facilities: In Project's vicinity.
  - 2. Scheduling Responsibility: Preparation of door hardware and keying schedules.

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- B. Architectural Hardware Consultant Qualifications: A person who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this Project and who is currently certified by DHI as follows:
  - 1. For door hardware, an Architectural Hardware Consultant (AHC)
- C. Source Limitations: Obtain each type of door hardware from a single manufacturer.
- D. Means of Egress Doors: Latches do not require more than 15 lbf to release the latch. Locks do not require use of a key, tool, or special knowledge for operation.
- E. Accessibility Requirements: Comply with applicable provisions in the DOJ's 2010 ADA Standards for Accessible Design, the ABA Standards of the Federal agency having jurisdiction, and ICC A117.1 for door hardware on doors in an accessible route.
  - 1. Provide operating devices that do not require tight grasping, pinching, or twisting of the wrist and that operate with a force of not more than 5 lbf.
  - 2. Spring Hinges: Adjust door and gate spring hinges so that, from an open position of 70 degrees, the time required to move the door to the closed position is 1.5 seconds minimum.

**1.7 DELIVERY, STORAGE, AND HANDLING**

- A. Inventory door hardware on receipt and provide secure lock-up for door hardware delivered to Project site.
- B. Tag each item or package separately with identification coordinated with the final door hardware schedule, and include installation instructions, templates, and necessary fasteners with each item or package.
- C. Deliver keys to manufacturer of key control system for subsequent delivery to Owner.

**1.8 COORDINATION**

- A. Installation Templates: Distribute for doors, frames, and other work specified to be factory prepared. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.

**1.9 WARRANTY**

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Structural failures including excessive deflection, cracking, or breakage.
    - b. Faulty operation of doors and door hardware.

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- c. Deterioration of metals, metal finishes, and other materials beyond normal weathering and use.
- 2. Warranty Period: Three years from date of Substantial Completion, unless otherwise indicated.
  - a. Exit Devices: Two years from date of Substantial Completion.

1.10 MAINTENANCE SERVICE

- A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

- A. Provide door hardware for each door as scheduled in Part 3 "Door Hardware Schedule" Article to comply with requirements in this Section.
  - 1. Door Hardware Sets: Provide quantity, item, size, finish or color indicated, and products equivalent in function and comparable in quality to named products.
- B. Designations: Requirements for design, grade, function, finish, size, and other distinctive qualities of each type of door hardware are indicated in Part 3 "Door Hardware Schedule" Article. Products are identified by using door hardware designations, as follows:
  - 1. Named Manufacturers' Products: Manufacturer and product designation are listed for each door hardware type required for the purpose of establishing minimum requirements. Manufacturers' names are abbreviated in Part 3 "Door Hardware Schedule" Article.

2.2 HINGES

- A. Hinges: BHMA A156.1
  - 1. Bommer Industries LB8206-630 or approved equal for 8'-0" high gates
  - 2. Bommer Industries LB8202-630 or approved equal for 3'-6" high gates

2.3 SELF-CLOSING HINGES AND PIVOTS

- A. Self-Closing Hinges and Pivots: BHMA A156.17.
  - 1. Bommer Industries LB4310-400-630 or approved equal



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- A. Exit Devices and Auxiliary Items: BHMA A156.3.
  - 1. Von Duprin 9847-NL-LBR-3'-US26D with weep holes or approved equal

**2.5 KEYING**

- A. Keying System: Factory registered, complying with guidelines in BHMA A156.28, Appendix A. Incorporate decisions made in keying conference.
  - 1. No Master Key System: Only change keys operate cylinder.
- B. Keys: Nickel silver.
  - 1. Quantity: In addition to one extra key blank for each lock, provide the following:
    - a. Cylinder Change Keys: Three.

**2.6 FABRICATION**

- A. Base Metals: Produce door hardware units of base metal indicated, fabricated by forming method indicated, using manufacturer's standard metal alloy, composition, temper, and hardness. Furnish metals of a quality equal to or greater than that of specified door hardware units and BHMA A156.18.
- B. Fasteners: Provide door hardware manufactured to comply with published templates prepared for machine, wood, and sheet metal screws. Provide screws that comply with commercially recognized industry standards for application intended, except aluminum fasteners are not permitted. Provide Phillips flat-head screws with finished heads to match surface of door hardware, unless otherwise indicated.

**2.7 FINISHES**

- A. Provide finishes complying with BHMA A156.18 as indicated in door hardware schedule.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

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**PART 3 - EXECUTION**

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## 3.1 EXAMINATION

- A. Examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire-rated door assembly construction, wall and floor construction, and other conditions affecting performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

## 3.2 INSTALLATION

- A. Mounting Heights: Mount door hardware units at heights to comply with the following unless otherwise indicated or required to comply with governing regulations.
  - 1. Standard Steel Doors and Frames: ANSI/SDI A250.8.
  - 2. Custom Steel Doors and Frames: HMMA 831.
- B. Install each door hardware item to comply with manufacturer's written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing. Do not install surface-mounted items until finishes have been completed on substrates involved.
  - 1. Set units level, plumb, and true to line and location. Adjust and reinforce attachment substrates as necessary for proper installation and operation.
  - 2. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.
- C. Hinges: Install types and in quantities indicated in door hardware schedule but not fewer than the number recommended by manufacturer for application indicated or one hinge for every 30 inches of door height, whichever is more stringent, unless other equivalent means of support for door, such as spring hinges or pivots, are provided.

## 3.3 ADJUSTING

- A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.
  - 1. Spring Hinges: Adjust to achieve positive latching when door is allowed to close freely from an open position of 30 degrees.

## 3.4 CLEANING AND PROTECTION

- A. Clean adjacent surfaces soiled by door hardware installation.

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- B. Clean operating items as necessary to restore proper function and finish.
- C. Provide final protection and maintain conditions that ensure that door hardware is without damage or deterioration at time of Substantial Completion.

3.5 DOOR HARDWARE SCHEDULE

Set No. 1 – At Grade Emergency Egress Gate

- 3 ea. Hinge
- 1 ea. Panic Device

Set No. 2 – Platform Level Emergency Egress Gate

- 2 ea. Spring Hinge
- 1 ea. Hinge

PART 4 - BASIS OF PAYMENT

4.1 Panic Device

- A. The quantity of panic devices will be paid for at the contract unit price bid per each for “Panic Device”.
- B. The unit price bid per each will be full compensation for all work covered by this Special Provision including, but not limited to, surface preparation, furnishing and placing panic devices.
- C. Payment will be made under:

Panic Device      Each

4.2 Hinge

- A. The quantity of hinges will be paid for at the contract unit price bid per each for “Hinge”.
- B. The unit price bid per each will be full compensation for all work covered by this Special Provision including, but not limited to, surface preparation, furnishing and placing hinges.
- C. Payment will be made under:

Hinge      Each

END OF SECTION 087100

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SECTION 099113 – PLATFORM PAINT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes surface preparation and the application of paint systems on the following exterior substrates:
  - 1. Concrete.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include preparation requirements and application instructions.
- B. Samples for Verification: For each type of paint system and each color and gloss of topcoat.
  - 1. Submit Samples on rigid backing, 8 inches square.
  - 2. Apply coats on Samples in steps to show each coat required for system.
  - 3. Label each coat of each Sample.
  - 4. Label each Sample for location and application area.

1.4 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Paint: 5 percent, but not less than 1 gal. of each material and color applied.

1.5 QUALITY ASSURANCE

- A. Mockups: Apply mockups of each paint system indicated and each color and finish selected to verify preliminary selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
  - 1. Architect will select one surface to represent surfaces and conditions for application of each paint system.
    - a. Vertical and Horizontal Surfaces: Provide samples of at least 25 linear feet.

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2. Final approval of color selections will be based on mockups.
3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.
  1. Maintain containers in clean condition, free of foreign materials and residue.
  2. Remove rags and waste from storage areas daily.

1.7 FIELD CONDITIONS

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.
- B. Do not apply paints in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to products listed in the Exterior Painting Schedule for the paint category indicated.

2.2 PAINT, GENERAL

- A. Material Compatibility:
  1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
  2. For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.
- B. Colors: As indicated on drawings.

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**PART 3 - EXECUTION**

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## 3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
  - 1. Concrete: 12 percent.
- C. Verify suitability of substrates, including surface conditions and compatibility, with existing finishes and primers.
- D. Proceed with coating application only after unsatisfactory conditions have been corrected.
  - 1. Application of coating indicates acceptance of surfaces and conditions.

## 3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates and paint systems indicated.
- B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
  - 1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection.
- C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
  - 1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.
- D. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.

## 3.3 APPLICATION

- A. Apply paints according to manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual."
  - 1. Use applicators and techniques suited for paint and substrate indicated.
  - 2. Paint surfaces behind movable items same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed items with prime coat only.

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3. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.

B. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

3.4 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.5 EXTERIOR PAINTING SCHEDULE

A. Concrete Platform Markings

1. Basis of Design: American Safety Technologies, (division of ITW Polymer Coatings), or approved equal

a. Primer: POS-100 WB; two-component, low VOC, water-based epoxy primer/sealer; or approved equal

b. Top Coat: AS-250; two-component, non-slip floor coating. Color: Federal Yellow; or approved equal.

PART 4 - BASIS OF PAYMENT

A. The quantity of platform paint will be paid for at the contract unit price bid per linear foot for "Platform Paint".

B. The unit price bid per linear foot will be full compensation for all work covered by this Special Provision including, but not limited to, surface preparation, furnishing and placing platform paint line and text.

C. Payment will be made under:

Platform Paint      Linear Foot

END OF SECTION 099113

**Project P-5705BB**  
SECTION 32176 – TACTILE WARNING SURFACE

**ARC-42**

**Mecklenburg County**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
  - 1. Cast-in-place detectable warning tiles.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For each type of tactile warning surface, in manufacturer's standard sizes unless otherwise indicated, showing edge condition, truncated-dome pattern, texture, color, and cross section; with fasteners and anchors.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For tactile warning surfacing, to include in maintenance manuals.

1.5 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.6 PROJECT CONDITIONS

- A. Cold-Weather Protection: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen subgrade or setting beds. Remove and replace unit paver work damaged by frost or freezing.

1.7 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of tactile warning surfaces that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:



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- a. Deterioration of finishes beyond normal weathering and wear.
  - b. Separation or delamination of materials and components.
2. Warranty Period: Five years from date of Substantial Completion.

**PART 2 - PRODUCTS****2.1 SURFACING, GENERAL**

- A. Accessibility Requirements: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines for Buildings and Facilities and ICC A117.1 for tactile warning surfaces.
  1. For tactile warning surfaces composed of multiple units, provide units that when installed provide consistent side-to-side and end-to-end dome spacing that complies with requirements.
- B. Source Limitations: Obtain each type of tactile warning surfacing from single source with resources to provide materials and products of consistent quality in appearance and physical properties.

**2.2 DETECTABLE WARNING TILES**

- A. Cast-in-Place Detectable Warning Tiles: Accessible truncated-dome detectable warning tiles with replaceable surface configured for setting flush in new concrete walkway surfaces, with slip-resistant surface treatment on domes and field of tile.
  1. Material: Molded glass- and carbon-fiber-reinforced polyester.
  2. Color: Safety yellow.
  3. Shapes and Sizes:
    - a. Rectangular panel, 24 by 48 inches.
  4. Dome Spacing and Configuration: 2.35-inch spacing, in square pattern.
  5. Mounting:
    - a. Replaceable detectable warning tile wet-set into freshly poured concrete and surface-fastened to permanently embedded anchors.

**2.3 ACCESSORIES**

- A. Fasteners and Anchors: Manufacturer's standard as required for secure anchorage of tactile warning surfaces, noncorrosive and compatible with each material joined, and complying with the following:
- B. Sealant: As recommended by manufacturer for sealing perimeter of tactile warning surfacing unit.

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**PART 3 - EXECUTION**

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## 3.1 EXAMINATION

- A. Verify that pavement is in suitable condition to begin installation according to manufacturer's written instructions. Verify that installation of tactile warning surfacing will comply with accessibility requirements upon completion.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

## 3.2 INSTALLATION OF TACTILE WARNING SURFACING

- A. General: Prepare substrate and install tactile warning surfacing according to manufacturer's written instructions unless otherwise indicated.
- B. Place tactile warning surfacing units in dimensions and orientation indicated. Comply with location requirements of AASHTO MP 12.

## 3.3 INSTALLATION OF DETECTABLE WARNING TILES

- A. Removable Cast-in-Place Detectable Warning Tiles:
  - 1. Concrete Paving Installation: Mix, place, and finish concrete to conditions complying with detectable warning tile manufacturer's written requirements for satisfactory embedment of removable tile.
  - 2. Set each detectable warning tile accurately and firmly in place with embedding anchors and fasteners attached, and firmly seat tile back in wet concrete by tamping or vibrating. If necessary, temporarily apply weight to tiles to ensure full contact with concrete.
  - 3. Set surface of tile flush with surrounding concrete and adjacent tiles, with variations between tiles and between concrete and tiles not exceeding plus or minus 1/8 inch from flush.
  - 4. Protect exposed surfaces of installed tiles from contact with wet concrete. Complete finishing of concrete paving surrounding tiles. Remove concrete from tile surfaces.
  - 5. Clean tiles using methods recommended in writing by manufacturer.

## 3.4 CLEANING AND PROTECTION

- A. Remove and replace tactile warning surfacing that is broken or damaged or does not comply with requirements in this Section. Remove in complete sections from joint to joint unless otherwise approved by Architect. Replace using tactile warning surfacing installation methods acceptable to Architect.
- B. Protect tactile warning surfacing from damage and maintain free of stains, discoloration, dirt, and other foreign material.

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**PART 4 - BASIS OF PAYMENT**

- A. The quantity of tactile warning surface will be paid for at the contract unit price bid per linear foot for "Tactile Warning Surface".
- B. The unit price bid per linear foot will be full compensation for all work covered by this Special Provision including, but not limited to, surface preparation, furnishing and placing tactile warning surface.
- C. Payment will be made under:

Tactile Warning Surface

Linear Foot

END OF SECTION 321726

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Mecklenburg County

**PROJECT SPECIAL PROVISIONS  
PLATFORM AND CONCOURSE - PLUMBING**

State ID #17-17955-01A

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4/2/2018



DocuSigned by:

*Edward Liwerant*

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**Project P-5705BB**

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**Mecklenburg County**

**SECTION 220528 - HANGERS AND SUPPORTS FOR PLUMBING PIPING**

**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

**1.2 SUMMARY**

A. Section Includes:

- 1. Metal pipe hangers and supports.
- 2. Trapeze pipe hangers.
- 3. Metal framing systems.
- 4. Fastener systems.

B. Related Sections:

- 1. Section 220547 - Vibration and Seismic Controls for Plumbing Piping.
- 2. Section 221317 - Stormwater Drainage Piping

**1.3 DEFINITIONS**

- A. D.I.P.: Ductile Iron Pipe
- B. HDPE: High-density polyethylene.
- C. PP: Polypropylene.
- D. MSS: Manufacturers Standardization Society of The Valve and Fittings Industry, Inc.

**1.4 PERFORMANCE REQUIREMENTS**

- A. Delegated Design: Design trapeze pipe hangers, including comprehensive engineering analysis by a qualified professional engineer licensed in the State of North Carolina, using performance requirements and design criteria indicated.
- B. Structural Performance: Hangers and supports for plumbing piping shall withstand the effects of gravity loads and stresses within limits and under conditions indicated according to ASCE/SEI 7 and/or as indicated on structural drawings.

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**Mecklenburg County**

1. Design supports for multiple pipes, capable of supporting combined weight of supported systems, system contents, and test water weight.
2. Design equipment supports capable of supporting combined operating weight of supported systems and components.
3. Design seismic-restraint hangers and supports for piping and obtain approval from authorities having jurisdiction.

**1.5 ACTION SUBMITTALS**

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Signed and sealed by a qualified professional engineer licensed in North Carolina. Show fabrication and installation details and include calculations for the following; include Product Data for components:
  1. Pipe Hangers and supports
  2. Trapeze pipe hangers.
  3. Metal framing systems.
- C. Delegated-Design Submittal: For trapeze hangers indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
  1. Detail fabrication and assembly of trapeze hangers.
  2. Design Calculations: Calculate requirements for designing trapeze hangers.

**1.6 INFORMATIONAL SUBMITTALS**

- A. Welding certificates.

**1.7 QUALITY ASSURANCE**

- A. Structural Steel Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- B. Pipe Welding Qualifications: Qualify procedures and operators according to ASME Boiler and Pressure Vessel Code.

**PART 2 - PRODUCTS**

**2.1 METAL PIPE HANGERS AND SUPPORTS**

- A. Carbon-Steel Pipe Hangers and Supports:
  1. Description: MSS SP-58, Types 1 through 58, factory-fabricated components.

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2. Galvanized Metallic Coatings: Pre-galvanized or hot dipped galvanized.
3. Hanger Rods: Continuous-thread rod, nuts, and washer made of hot-dipped galvanized carbon steel.

**2.2 TRAPEZE PIPE HANGERS**

- A. Description: MSS SP-69, Type 59, shop- or field-fabricated pipe-support assembly made from structural carbon-steel shapes with MSS SP-58 carbon-steel hanger rods, nuts, saddles, and U-bolts, fully hot-dipped galvanized after fabrication.

**2.3 METAL FRAMING SYSTEMS**

- A. MFMA Manufacturer Metal Framing Systems:

1. Description: Shop- or field-fabricated pipe-support assembly for supporting multiple parallel pipes.
2. Standard: MFMA-4.
3. Channels: Continuous slotted steel channel with inturned lips.
4. Channel Nuts: Formed or stamped steel nuts or other devices designed to fit into channel slot and, when tightened, prevent slipping along channel.
5. Hanger Rods: Continuous-thread rod, nuts, and washer made of carbon steel.
6. Metallic Coating: Hot-dipped galvanized.

- B. Non-MFMA Manufacturer Metal Framing Systems:

1. Description: Shop- or field-fabricated pipe-support assembly for supporting multiple parallel pipes.
2. Standard: MFMA-4.
3. Channels: Continuous slotted steel channel with inturned lips.
4. Channel Nuts: Formed or stamped steel nuts or other devices designed to fit into channel slot and, when tightened, prevent slipping along channel.
5. Hanger Rods: Continuous-thread rod, nuts, and washer made of carbon steel.
6. Metallic Coating: Hot-dipped galvanized.

**2.4 FASTENER SYSTEMS**

- A. Mechanical-Expansion Anchors: Insert-wedge-type, stainless-steel anchors, for use in hardened Portland cement concrete; with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

**2.5 MISCELLANEOUS MATERIALS**

- A. Structural Steel: ASTM A 36/A 36M, carbon-steel plates, shapes, and bars; hot-dipped galvanized.

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- B. Grout: ASTM C 1107, factory-mixed and -packaged, dry, hydraulic-cement, non-shrink and nonmetallic grout; suitable for interior and exterior applications.
1. Properties: Non-staining, noncorrosive, and nongaseous.
  2. Design Mix: 5000-psi (34.5-MPa), 28-day compressive strength.

**PART 3 - EXECUTION****3.1 HANGER AND SUPPORT INSTALLATION**

- A. Metal Pipe-Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Install hangers, supports, clamps, and attachments as required to properly support piping from the building structure.
- B. Metal Trapeze Pipe-Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Arrange for grouping of parallel runs of horizontal piping, and support together on field-fabricated trapeze pipe hangers.
1. Pipes of Various Sizes: Support together and space trapezes for smallest pipe size or install intermediate supports for smaller diameter pipes as specified for individual pipe hangers.
  2. Field fabricate from ASTM A 36/A 36M, carbon-steel shapes selected for loads being supported. Weld steel according to AWS D1.1/D1.1M.
- C. Metal Framing System Installation: Arrange for grouping of parallel runs of piping, and support together on field-assembled metal framing systems.
- D. Fastener System Installation:
- E. Install hangers and supports complete with necessary attachments, inserts, bolts, rods, nuts, washers, and other accessories.
- F. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.
- G. Install lateral bracing with pipe hangers and supports to prevent swaying.
- H. Install building attachments within concrete slabs or attach to structural steel. Install additional attachments at concentrated loads, and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten inserts to forms and install reinforcing bars through openings at top of inserts.
- I. Load Distribution: Install hangers and supports so that piping live and dead loads and stresses from movement will not be transmitted to connected equipment.



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- J. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and to not exceed maximum pipe deflections allowed by ASME B31.9 for building services piping.

**3.2 METAL FABRICATIONS**

- A. Cut, drill, and fit miscellaneous metal fabrications for trapeze pipe hangers and supports.
- B. Fit exposed connections together to form hairline joints. Field weld connections that cannot be shop welded because of shipping size limitations.
- C. Field Welding: Comply with AWS D1.1/D1.1M procedures for shielded, metal arc welding; appearance and quality of welds; and methods used in correcting welding work; and with the following:
  - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
  - 2. Obtain fusion without undercut or overlap.
  - 3. Remove welding flux immediately.
  - 4. Finish welds at exposed connections so no roughness shows after finishing and so contours of welded surfaces match adjacent contours.

**3.3 ADJUSTING**

- A. Hanger Adjustments: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.
- B. Trim excess length of continuous-thread hanger and support rods to 1-1/2 inches (40 mm)

**3.4 PAINTING**

- A. Touchup: Clean and touchup paint of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal using sprayed zinc.
- B. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

**3.5 HANGER AND SUPPORT SCHEDULE**

- A. Specific hanger and support requirements are in Sections specifying piping systems and equipment.
- B. Comply with MSS SP-69 for pipe-hanger selections and applications that are not specified in piping system Sections.
- C. Use hangers and supports with galvanized metallic coatings for piping and equipment that will not have field-applied finish.

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- D. Use nonmetallic coatings on attachments for electrolytic protection where attachments are in direct contact with copper tubing.
- E. Use stainless-steel pipe hanger attachments for hostile environment applications.
- F. Horizontal-Piping Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
  - 1. Adjustable, Steel Clevis Hangers (MSS Type 1): For suspension of non-insulated or insulated, stationary pipes D.I.P. size 3" to D.I.P. size 24".
  - 2. Yoke-Type Pipe Clamps (MSS Type 2): For suspension of up to 1050 deg. F (566 deg. C), pipes D.I.P. size 4" to D.I.P. size 24", requiring up to 4 inches (100 mm) of insulation.
  - 3. Carbon- or Alloy-Steel, Double-Bolt Pipe Clamps (MSS Type 3): For suspension of pipes D.I.P. size 3" to D.I.P. size 24", requiring clamp flexibility and up to 4 inches (100 mm) of insulation.
  - 4. Steel Pipe Clamps (MSS Type 4): For suspension of cold and hot pipes D.I.P. size 3" to D.I.P. size 24" if little or no insulation is required.
  - 5. Pipe Hangers (MSS Type 5): For suspension of pipes D.I.P. size 3" and 4", to allow off-center closure for hanger installation before pipe erection.
  - 6. Adjustable, Swivel Split- or Solid-Ring Hangers (MSS Type 6): For suspension of non-insulated, stationary pipes D.I.P. size 3" to size 8".
  - 7. Adjustable, Steel Band Hangers (MSS Type 7): For suspension of non-insulated, stationary pipes D.I.P. size 3" to size 8".
  - 8. Adjustable Band Hangers (MSS Type 9): For suspension of non-insulated, stationary pipes D.I.P. size 3" to size 8".
  - 9. Adjustable, Swivel-Ring Band Hangers (MSS Type 10): For suspension of non-insulated, stationary pipes D.I.P. size 3" to size 8"..
  - 10. Split Pipe Ring with or without Turnbuckle Hangers (MSS Type 11): For suspension of non-insulated, stationary pipes D.I.P. size 3" to size 8".
  - 11. Extension Hinged or Two-Bolt Split Pipe Clamps (MSS Type 12): For suspension of non-insulated, stationary pipes D.I.P. size 3" to size 8".
  - 12. U-Bolts (MSS Type 24): For support of heavy pipes D.I.P. size 3" to size 8".
  - 13. Clips (MSS Type 26): For support of insulated pipes not subject to expansion or contraction.
- G. Vertical-Piping Clamps: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
  - 1. Extension Pipe or Riser Clamps (MSS Type 8): For support of pipe risers D.I.P. size 3" to D.I.P. size 24".
  - 2. Carbon- or Alloy-Steel Riser Clamps (MSS Type 42): For support of pipe risers D.I.P. size 3" to D.I.P. size 24" if longer ends are required for riser clamps.
- H. Hanger-Rod Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
  - 1. Steel Turnbuckles (MSS Type 13): For adjustment up to 6 inches (150 mm) for heavy loads.

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- 2. Steel Clevises (MSS Type 14): For 120 to 450 deg. F (49 to 232 deg. C) piping installations.
  - 3. Swivel Turnbuckles (MSS Type 15): For use with MSS Type 11, split pipe rings.
  - 4. Malleable-Iron Sockets (MSS Type 16): For attaching hanger rods to various types of building attachments.
  - 5. Steel Weldless Eye Nuts (MSS Type 17): For 120 to 450 deg. F (49 to 232 deg. C) piping installations.
- I. Building Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
- 1. Steel or Malleable Concrete Inserts (MSS Type 18): For upper attachment to suspend pipe hangers from concrete ceiling.
  - 2. Center-Beam Clamps (MSS Type 21): For attaching to center of bottom flange of beams.
  - 3. Welded Beam Attachments (MSS Type 22): For attaching to bottom of beams if loads are considerable and rod sizes are large.
  - 4. C-Clamps (MSS Type 23): For structural shapes.
  - 5. Side-Beam Clamps (MSS Type 27): For bottom of steel I-beams.
  - 6. Steel-Beam Clamps with Eye Nuts (MSS Type 28): For attaching to bottom of steel I-beams for heavy loads.
  - 7. Linked-Steel Clamps with Eye Nuts (MSS Type 29): For attaching to bottom of steel I-beams for heavy loads, with link extensions.
  - 8. Malleable-Beam Clamps with Extension Pieces (MSS Type 30): For attaching to structural steel.
  - 9. Welded-Steel Brackets: For support of pipes from below or for suspending from above by using clip and rod. Use one of the following for indicated loads:
    - a. Heavy (MSS Type 33): 3000 lb. (1360 kg).
  - 10. Side-Beam Brackets (MSS Type 34): For sides of steel beams.
- J. Comply with MSS SP-69 for trapeze pipe-hanger selections and applications that are not specified in piping system Sections.
- K. Comply with MFMA-103 for metal framing system selections and applications that are not specified in piping system Sections.
- L. Use mechanical-expansion anchors instead of building attachments where required in concrete construction.

**PART 4 - BASIS OF PAYMENT**

The lump sum payment shall include all labor, material, and equipment necessary to complete the work. No additional payment will be made for corrective actions.

Payment will be made under:

Pay Item	Unit
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Platform Structure Drainage System

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0012DEL\_P28  
**Mecklenburg County**  
Lump Sum

**END OF SECTION 220528**

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**Mecklenburg County**

**SECTION 220547 - VIBRATION AND SEISMIC CONTROLS FOR PLUMBING PIPING**

**PART 5 - GENERAL**

**5.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

**5.2 SUMMARY**

- A. Section Includes:
  - 1. Restraint channel bracings.
  - 2. Restraint cables.
  - 3. Seismic-restraint accessories.
  - 4. Mechanical anchor bolts.
- B. Related Requirements:
  - 1. Section 220528 – Hangers and Supports for Plumbing Piping.

**5.3 DEFINITIONS**

- A. AWS: American Welding Society
- B. CFR: Code of Federal Regulations
- C. NC BC: North Carolina Building Code.
- D. ICC-ES: ICC-Evaluation Service.
- E. MSS: Manufacturers Standardization Society of The Valve and Fittings Industry Inc.
- F. NRTL: Nationally Recognized Testing Laboratory
- G. OSHA: Occupational Safety and Health Administration

**5.4 ACTION SUBMITTALS**

- A. Product Data: For each type of product.
  - 1. Include rated load, rated deflection, and overload capacity for each vibration isolation device.

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2. Illustrate and indicate style, material, strength, fastening provision, and finish for each type and size of vibration isolation device and seismic-restraint component required.
  - a. Tabulate types and sizes of seismic restraints, complete with report numbers and rated strength in tension and shear as evaluated by evaluation service member of ICC-ES or an agency acceptable to authorities having jurisdiction.
  - b. Annotate to indicate application of each product submitted and compliance with requirements.

**B. Shop Drawings:**

1. Detail fabrication and assembly of equipment bases. Detail fabrication including anchorages and attachments to structure and to supported equipment.

**C. Delegated-Design Submittal: For each vibration isolation and seismic-restraint device.**

1. Include design calculations and details for selecting vibration isolators and seismic restraints complying with performance requirements, design criteria, and analysis data signed and sealed by the qualified professional engineer licensed in the State of North Carolina responsible for their preparation.
2. Design Calculations: Calculate static and dynamic loading due to equipment weight and operation, due to seismic forces required to select vibration isolators, and due to seismic restraints.
3. Riser Supports: Include riser diagrams and calculations showing anticipated expansion and contraction at each support point, initial and final loads on building structure, spring deflection changes, and seismic loads. Include certification that riser system was examined for excessive stress and that none exists.
4. Seismic-Restraint Details:
  - a. Design Analysis: To support selection and arrangement of seismic restraints. Include calculations of combined tensile and shear loads.
  - b. Details: Indicate fabrication and arrangement. Detail attachments of restraints to the restrained items and to the structure. Show attachment locations, methods, and spacings. Identify components, list their strengths, and indicate directions and values of forces transmitted to the structure during seismic events. Indicate association with vibration isolation devices.
  - c. Preapproval and Evaluation Documentation: By an evaluation service member of ICC-ES or an agency acceptable to authorities having jurisdiction, showing maximum ratings of restraint items and the basis for approval (tests or calculations).

**5.5 INFORMATIONAL SUBMITTALS**

- A. Coordination Drawings: Show coordination of vibration isolation device installation and seismic bracing for plumbing piping and equipment with other systems and equipment in the vicinity, including other supports and restraints, if any.
- B. Qualification Data: For professional engineer licensed in the State of North Carolina.

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- C. Welding certificates.
- D. Field quality-control reports.

**5.6 QUALITY ASSURANCE**

- A. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct the testing indicated, that is an NRTL as defined by OSHA in 29 CFR 1910.7 and that is acceptable to authorities having jurisdiction.
- B. Comply with seismic-restraint requirements in the NC BC unless requirements in this Section are more stringent.
- C. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- D. Seismic-restraint devices shall have horizontal and vertical load testing and analysis and shall be preapproval by ICC-ES, or preapproval by another agency acceptable to authorities having jurisdiction, showing maximum seismic-restraint ratings. Ratings based on independent testing are preferred to ratings based on calculations. If preapproved ratings are unavailable, submittals based on independent testing are preferred. Calculations (including combining shear and tensile loads) to support seismic-restraint designs must be signed and sealed by a qualified professional engineer licensed in the State of North Carolina.

**PART 6 - PRODUCTS****6.1 PERFORMANCE REQUIREMENTS**

- A. Seismic-Restraint Loading:
  - 1. Site Class as Defined in the NC BC: Refer to structural drawings, cover sheet.
  - 2. Assigned Seismic Use Group or Building Category as Defined in the NC BC: Refer to structural drawings, cover sheet.
    - a. Component Importance Factor: 1.5
    - b. Component Response Modification Factor: 2.5
    - c. Component Amplification Factor: 2.5
  - 3. Design Spectral Response Acceleration at Short Periods (0.2 Second): Refer to structural drawings, cover sheet.
  - 4. Design Spectral Response Acceleration at 1.0-Second Period: Refer to structural drawings, cover sheet.
  - 5. Rated strengths, features, and applications shall be as defined in reports by an evaluation service member of ICC-ES or an agency acceptable to authorities having jurisdiction.

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- a. Structural Safety Factor: Allowable strength in tension, shear, and pullout force of components shall be at least five times the maximum seismic forces to which they are subjected.

**6.2 RESTRAINT CHANNEL BRACINGS**

- A. Description: MFMA-4, shop- or field-fabricated bracing assembly made of slotted steel channels with accessories for attachment to braced component at one end and to building structure at the other end and other matching components and with corrosion-resistant coating; rated in tension, compression, and torsion forces.

**6.3 RESTRAINT CABLES**

- A. Restraint Cables: ASTM A 603 galvanized-steel cables. End connections made of steel assemblies with thimbles, brackets, swivel, and bolts designed for restraining cable service; with a minimum of two clamping bolts for cable engagement.

**6.4 SEISMIC-RESTRAINT ACCESSORIES**

- A. Hanger-Rod Stiffener: Steel tube or steel slotted-support-system sleeve with internally bolted connections or Reinforcing steel angle clamped to hanger rod.
- B. Hinged and Swivel Brace Attachments: Multifunctional steel connectors for attaching hangers to rigid channel bracings and restraint cables.

**6.5 MECHANICAL ANCHOR BOLTS**

- A. Mechanical Anchor Bolts: Drilled-in and stud-wedge or female-wedge type stainless steel. Select anchor bolts with strength required for anchor and as tested according to ASTM E 488.

**PART 7 - EXECUTION****7.1 EXAMINATION**

- A. Examine areas and equipment to receive vibration isolation and seismic-control devices for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine roughing-in of reinforcement and cast-in-place anchors to verify actual locations before installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.



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- A. Multiple Pipe Supports: Secure pipes to trapeze member with clamps approved for application by an evaluation service member of ICC-ES or an agency acceptable to authorities having jurisdiction.
- B. Hanger-Rod Stiffeners: Install hanger-rod stiffeners where indicated or scheduled on Drawings to receive them and where required to prevent buckling of hanger rods due to seismic forces.
- C. Strength of Support and Seismic-Restraint Assemblies: Where not indicated, select sizes of components so strength is adequate to carry present and future static and seismic loads within specified loading limits.

**7.3 VIBRATION CONTROL AND SEISMIC-RESTRAINT DEVICE INSTALLATION**

- A. Coordinate the location of embedded connection hardware with supported equipment attachment and mounting points and with requirements for concrete reinforcement.
- B. Piping Restraints:
  - 1. Comply with requirements in MSS SP-127.
  - 2. Space lateral supports a maximum of 40 feet (12 m) o.c., and longitudinal supports a maximum of 80 feet (24 m) o.c.
  - 3. Brace a change of direction longer than 12 feet (3.7 m).
- C. Install cables so they do not bend across edges of adjacent equipment or building structure.
- D. Install seismic-restraint devices using methods approved by an evaluation service member of ICC-ES or an agency acceptable to authorities having jurisdiction that provides required submittals for component.
- E. Install bushing assemblies for anchor bolts for floor-mounted equipment, arranged to provide resilient media between anchor bolt and mounting hole in concrete base.
- F. Install bushing assemblies for mounting bolts for wall-mounted equipment, arranged to provide resilient media where equipment or equipment-mounting channels are attached to wall.
- G. Attachment to Structure: If specific attachment is not indicated, anchor bracing to structure at flanges of beams, at upper truss chords of bar joists, or at concrete members.
- H. Drilled-in Anchors:
  - 1. Identify position of reinforcing steel and other embedded items prior to drilling holes for anchors. Do not damage existing reinforcing or embedded items during coring or drilling. Notify the structural engineer if reinforcing steel or other embedded items are encountered during drilling. Locate and avoid prestressed tendons, electrical and telecommunications conduit, and gas lines.

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2. Do not drill holes in concrete or masonry until concrete, mortar, or grout has achieved full design strength.
3. Wedge Anchors: Protect threads from damage during anchor installation. Heavy-duty sleeve anchors shall be installed with sleeve fully engaged in the structural element to which anchor is to be fastened.
4. Set anchors to manufacturer's recommended torque, using a torque wrench.

**7.4 ACCOMMODATION OF DIFFERENTIAL SEISMIC MOTION**

- A. Install flexible connections in piping where they cross seismic joints, where adjacent sections or branches are supported by different structural elements, and where the connections terminate with connection to equipment that is anchored to a different structural element from the one supporting the connections as they approach equipment.

**7.5 FIELD QUALITY CONTROL**

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- B. Perform tests and inspections.
- C. Tests and Inspections:
  1. Provide evidence of recent calibration of test equipment by a testing agency acceptable to authorities having jurisdiction.
  2. Schedule test with Owner, through Architect, before connecting anchorage device to restrained component (unless post-connection testing has been approved), and with at least seven days' advance notice.
  3. Obtain Architect's approval before transmitting test loads to structure. Provide temporary load-spreading members.
  4. Test at least four of each type and size of installed anchors and fasteners selected by Owner's representative.
  5. Test to 90 percent of rated proof load of device.
- D. Remove and replace malfunctioning units and retest as specified above.
- E. Prepare test and inspection reports.

**7.6 ADJUSTING**

- A. Adjust all bracings and hangers after piping system is at operating weight.

**PART 8 - BASIS OF PAYMENT**

The lump sum payment shall include all labor, material, and equipment necessary to complete the work. No additional payment will be made for corrective actions.

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**Project P-5705BB**

**PL-16**

**Mecklenburg County**

Payment will be made under:

<u>Pay Item</u>
Platform Structure Drainage System

<u>Unit</u>
Lump Sum

**END OF SECTION 220547**

**SECTION 221317 – STORMWATER DRAINAGE PIPING**

**PART 9 - GENERAL**

**9.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

**9.2 SUMMARY**

- A. Section Includes:
  - 1. Ductile-iron pipe and fittings.
  - 2. Specialty pipe fittings.
- B. Related Requirements:
  - 1. Section 220547 - Vibration and Seismic Controls for Plumbing Piping
  - 2. Section 220528 - Hangers and Supports for Plumbing Piping
  - 3. Section 221423 - Storm Drainage Piping Specialties
  - 4. Refer to Contract Plans for additional requirements

**9.3 ACTION SUBMITTALS**

- A. Product Data: For each type of product.
- B. Shop Drawings: For drainage system. Include plans, elevations, sections, and details.

**9.4 INFORMATIONAL SUBMITTALS**

- A. Seismic Qualification Certificates: For drainage piping, accessories, and components, from manufacturer.
  - 1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
  - 2. Detailed description of piping anchorage devices on which the certification is based and their installation requirements.
- B. Field quality-control reports.

9.5 DEFINITIONS

- B. HDPE: High-density polyethylene.
- C. PP: Polypropylene.

**PART 10 - PRODUCTS**

10.1 Manufacturers

1. Manufacturers: All stormwater piping products shall meet requirements of Buy America Act. Subject to compliance with requirements, provide products by one of the following:
  - a) American Ductile Iron Pipe  
P.O. Box 2727  
Birmingham, AL 35202-2727  
Phone: (800) 442-2347  
Fax: (800) 442-2348  
<http://www.american-usa.com>
  - b) McWane Ductile  
P.O. Box 6001  
Coshocton, OH 43812-6001  
Phone: (205) 414-3100  
<http://www.mcwaneductile.com>
  - c) United States Pipe and Foundry Company  
Two Chase Corporate Drive  
Suite 200  
Birmingham, AL 35244  
Phone: (205) 254-7442  
Fax: (205) 254-7165  
<http://www.uspipe.com>

10.2 PERFORMANCE REQUIREMENTS

- A. Ductile Iron Pipe (D.I.P.) shall be Class 350 rated up to 350 PSIG.
- B. Components and installation shall be capable of withstanding the following minimum working pressure unless otherwise indicated:
  1. Stormwater Drainage Piping: 10-foot head of water (30 kPa)

- C. Seismic Performance: Stormwater Drainage Piping and support and installation shall withstand the effects of earthquake motions determined according to ASCE/SEI 7 and/or requirements shown on structural drawings.

#### 10.3 PIPING MATERIALS

- A. Piping materials shall bear label, stamp, or other markings of specified testing agency.
- B. Comply with requirements in "Piping Schedule" Article for applications of pipe, tube, fitting materials, and joining methods for specific services, service locations, and pipe sizes.

#### 10.4 DUCTILE-IRON PIPE AND FITTINGS

##### A. Ductile-Iron, Mechanical-Joint Piping:

1. Ductile-Iron Pipe: AWWA C151/A21.51, with mechanical-joint bell and plain spigot ends unless grooved or flanged ends are indicated.
2. Ductile-Iron Fittings: AWWA C110/A21.10, mechanical-joint, ductile- or gray-iron standard pattern or AWWA C153/A21.53, ductile-iron compact pattern.
3. Glands, Gaskets, and Bolts: AWWA C111/A21.11, ductile- or gray-iron glands, rubber gaskets, and steel bolts.

##### B. Ductile-Iron, Push-on-Joint Piping:

1. Ductile-Iron Pipe: AWWA C151/A21.51, with push-on-joint bell and plain spigot ends unless grooved or flanged ends are indicated.
2. Ductile-Iron Fittings: AWWA C110/A21.10, push-on-joint, ductile- or gray-iron standard pattern or AWWA C153/A21.53, ductile-iron compact pattern.
3. Gaskets: AWWA C111/A21.11, rubber.

##### C. Ductile-Iron, Flanged Joint Piping:

1. Ductile-Iron Pipe: AWWA C115, with factory cast or threaded flanges
2. Gaskets: AWWA C111/A21.11, rubber.

#### 10.5 SPECIALTY PIPE FITTINGS

##### A. Transition Couplings:

1. Fitting-Type Transition Couplings: Manufactured piping coupling or specified piping system fitting.
2. Pressure Transition Couplings:
  - a. Standard: AWWA C219.
  - b. Description: Metal, sleeve-type same size as, with pressure rating at least equal to, and ends compatible with, pipes to be joined.

- c. Center-Sleeve Material: Ductile iron.
- d. Gasket Material: Natural or synthetic rubber.
- e. Metal Component Finish: Corrosion-resistant coating or material.

**PART 11 - EXECUTION**

## 11.1 EARTH MOVING

- A. Coordinate with requirements for excavating, trenching, and backfilling as specified and/or shown in structural specifications or drawings. In lieu of dedicated structural requirements follow industry best practices and details on Contract Drawings.

## 11.2 PIPING INSTALLATION

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems.
  - 1. Indicated locations and arrangements were used to size pipe in accordance with applicable codes, friction loss, expansion, and other design considerations.
  - 2. Install piping as indicated unless deviations to layout are approved on coordination drawings.
- B. Diagonal runs are prohibited unless specifically indicated otherwise.
- C. Install piping to permit cleanout servicing.
- D. Install piping at indicated slopes.
- E. Install piping free of sags and bends.
- F. Install fittings for changes in direction and branch connections.
- G. Install seismic restraints on piping.
- H. Make changes in direction for stormwater drainage piping using appropriate branches, bends, and long-sweep bends.
  - 1. Tees and short-sweep 1/4 bends may be used on vertical stacks if change in direction of flow is from horizontal to vertical.
  - 2. Use long-turn, double Y-branch and 1/8-bend fittings, or wye fittings.
  - 3. Do not change direction of flow more than 90 degrees.
  - 4. Use proper size of standard increasers and reducers if pipes of different sizes are connected.
  - 5. Reducing size of drainage piping in direction of flow is prohibited.
- I. Lay buried drainage piping beginning at low point of each system.

1. Install true to grades and alignment indicated, with unbroken continuity of invert. Place hub or mechanical joints ends of piping upstream.
  2. Install required gaskets according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements.
  3. Maintain swab in piping and pull past each joint as completed.
- J. Install piping according to applicable plumbing code.
- K. Install underground, ductile-iron piping according to AWWA C600.
1. Install buried piping inside building between wall and floor penetrations and connection to piping outside building with restrained joints.
  2. Anchor pipe to wall or floor. Install thrust-block supports at vertical and horizontal offsets.
- L. Do not enclose, cover, or put piping into operation until it is inspected and approved by authorities having jurisdiction.

**11.3 JOINT CONSTRUCTION**

- A. Join hub-and-spigot, D.I.P. piping per Ductile Iron Pipe Research Association (DIPRA) standards.
- B. Join mechanical joint D.I.P. piping per Ductile Iron Pipe Research Association (DIPRA) standards.
- C. Flanged Joints: Align bolt holes. Select appropriate gasket material, size, type, and thickness. Install gasket concentrically positioned. Use suitable lubricants on bolt threads. Torque bolts in cross pattern.

**11.4 SPECIALTY PIPE FITTING INSTALLATION**

- A. Transition Couplings:
  1. Install transition couplings at joints of piping with small differences in ODs.

**11.5 HANGER AND SUPPORT INSTALLATION**

- A. Comply with requirements for seismic-restraint devices specified in Section 220547 "Vibration and Seismic Controls for Plumbing Piping."
- B. Comply with requirements for pipe hanger and support devices and installation specified in Section 220528 "Hangers and Supports for Plumbing Piping" .
  1. Install hot-dip galvanized carbon-steel pipe hangers for horizontal piping in noncorrosive environments.
  2. Install stainless-steel pipe hangers for horizontal piping in corrosive environments.



3. Install hot-dip galvanized carbon-steel pipe support clamps for vertical piping in noncorrosive environments.
  4. Install stainless-steel pipe support clamps for vertical piping in corrosive environments.
  5. Vertical Piping: refer to Contract Drawings
  6. Horizontal Piping: refer to Contract Drawings
- C. Support horizontal piping within 12 inches (300 mm) of each fitting, and coupling.
- D. Support vertical piping within 12" (300 mm) of base and at each floor.
- E. Rod diameter may be reduced one size for double-rod hangers, with 1/2-inch (12.7 mm) minimum rods.
- F. Install hangers for D.I.P. piping with the following maximum horizontal spacing and minimum rod diameters:
1. Size 4": 12 feet (3.7 m) with 5/8-inch (16-mm) rod.
  2. Size 6" and Size 8": 12 feet (3.7 m) with 3/4-inch (19-mm) rod.
  3. Size 10" and Size 12": 12 feet (3.7 m) with 7/8-inch (22-mm) rod.
- G. Install supports for vertical piping every 10 feet (3.3 m).
- H. Support piping and tubing not listed above according to MSS SP-58 and manufacturer's written instructions.
- 11.6 CONNECTIONS
- A. Drawings indicate general arrangement of piping, fittings, and specialties.
- 11.7 IDENTIFICATION
- A. Identify exposed stormwater drain piping.
- 11.8 FIELD QUALITY CONTROL
- A. During installation, notify authorities having jurisdiction at least 24 hours before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction.
1. Roughing-in Inspection: Arrange for inspection of piping before concealing or closing-in after roughing-in and before setting fixtures.
  2. Final Inspection: Arrange for final inspection by authorities having jurisdiction to observe tests specified below and to ensure compliance with requirements.
- B. Reinspection: If authorities having jurisdiction find that piping will not pass test or inspection, make required corrections and arrange for reinspection.
- C. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.

- D. Test stormwater drainage piping according to procedures of authorities having jurisdiction or, in absence of published procedures, as follows:
  - 1. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired.
    - a. If testing is performed in segments, submit separate report for each test, complete with diagram of portion of piping tested.
  - 2. Leave uncovered and unconcealed new, altered, extended, or replaced waste and vent piping until it has been tested and approved.
    - a. Expose work that was covered or concealed before it was tested.

**11.9 CLEANING AND PROTECTION**

- A. Clean interior of piping. Remove dirt and debris as work progresses.
- B. Protect stormwater drainage piping during remainder of construction period to avoid clogging with dirt and debris and to prevent damage from traffic and construction work.
- C. Place plugs in ends of uncompleted piping at end of day and when work stops.
- D. Repair damage to adjacent materials caused by waste and vent piping installation.

**11.10 PIPING SCHEDULE**

- A. Flanges shall be used on aboveground piping unless otherwise indicated.
- B. Underground stormwater drainage piping shall be any of the following:
  - 1. Ductile-iron, mechanical-joint piping and mechanical joints.
  - 2. Ductile-iron, push-on-joint piping and push-on joints.

**PART 12 - BASIS OF PAYMENT**

The lump sum payment shall include all labor, material, and equipment necessary to complete the work. No additional payment will be made for corrective actions.

Payment will be made under:

<u>Pay Item</u>	<u>Unit</u>
Platform Structure Drainage System	Lump Sum

**END OF SECTION 221317**

**SECTION 221423 - STORM DRAINAGE PIPING SPECIALTIES**

**PART 13 - GENERAL**

**13.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

**13.2 SUMMARY**

- A. Section Includes:
  - 1. Trench drains.
  - 2. Cleanouts.
- B. Related Requirements:
  - 1. See Contract Drawings

**13.3 ACTION SUBMITTALS**

- A. Product Data: For each type of product.

**13.4 QUALITY ASSURANCE**

- A. Drainage piping specialties shall bear label, stamp, or other markings of specified testing agency.

**13.5 DEFINITIONS**

- A. D.I.P.: Ductile iron Pipe
- B. HDPE: High-density polyethylene.
- C. PP: Polypropylene.

**PART 14 - PRODUCTS**

**14.1 MANUFACTURERS**

1. Manufacturers: All stormwater drainage piping specialty products shall meet requirements of Buy America Act. Subject to compliance with requirements, provide products by one of the following:

a) Zurn Industries, LLC  
1801 Pittsburgh Ave  
Erie, PA 16502  
855-663-9876  
www.zurn.com

b) J.R. Smith MFG. CO.  
Post Office Box 3237  
Montgomery, Alabama 36109-0237  
t334-277-8520  
www.jrsmith.com

c) Watts, Inc.  
905-332-4090  
www.watts.com

**14.2 CLEANOUTS**

**A. Ductile-Iron Exposed Cleanouts:**

1. Standard: ASME A115.
2. Size: Same as connected branch but not less than 4" pipe size
3. Body Material: as required to match connected piping.
4. Closure: Countersunk at finished slabs, blind flange under the platform slab.

**14.3 TRENCH DRAINS**

**A. Trench Drain General Description:** Modular channel sections shall be made of 0% water absorbent High Density Polyethylene (HDPE) or polypropylene. Channels shall have a positive mechanical connection between channel sections that will not separate during the installation and mechanically lock into the concrete surround a minimum of every 10" (254mm). Channels have rebar clips standard to secure trench in its final location. Channels shall be provided with grates that lock down with lockdown bars to the channel.

**B. Features:**

1. Standard: ASME A112.6.3.
2. Body Material: Polypropylene or High-Density Polyethylene (HDPE)

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3. Flange: Anchor.
4. Clamping Device: Required.
5. Outlet: Refer to Contract Drawings.
6. Outlet Type: Inside caulk with domed strainer.
7. Grate Material: stainless steel.
8. Grate Finish: mill.
9. Grate Type: ADA and heel-proof.
10. Grating attachment: vandal-proof
11. Dimensions of Frame and Grate: Refer to Contract Drawings.
12. Top-Loading Classification: heavy.
13. Nominal length: 80"
14. Trench bottom: sloped

**PART 15 - EXECUTION****15.1 INSTALLATION**

- A. Install trench drains at low points of platform areas and as indicated on Contract Drawings per manufacturer's written installation instructions. Coordinate trench drain installation with architectural and structural drawings.
- B. Install cleanouts in aboveground piping and buried drain piping according to the following instructions unless otherwise indicated:
  1. Use cleanouts the same size as drainage piping up to size 4" D.I.P. Use Size 4" D.I.P. for larger drainage piping unless larger cleanout is indicated.
  2. Locate cleanouts at each change in direction of piping greater than 45 degrees.
  3. Locate cleanouts at minimum intervals of 50 feet (15 m) for piping size 4" D.I.P. and smaller and 100 feet (30 m) for larger piping.
  4. Locate cleanouts at base of each vertical storm piping conductor.
  5. Contract Drawings indicate cleanout locations required for the specific installation. Provide additional cleanout as stated above.
  6. Typical cleanout on D.I.P. shall be flange and blind flange set.
  7. Evaluate feasibility of using trench drain vertical outlet piping as cleanouts.
- C. For concrete slab cleanouts for piping below, install cleanout deck plates with top flush with finished slab.
- D. Assemble channel drainage system components according to manufacturer's written instructions. Install on support devices so that top will be flush with adjacent surface.

**15.2 CONNECTIONS**

- A. Comply with requirements for piping specified in Section 221317 "Storm Drainage Piping." Drawings indicate general arrangement of piping, fittings, and specialties.

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**15.3 PROTECTION**

- A. Protect drains during remainder of construction period to avoid clogging with dirt or debris and to prevent damage from traffic or construction work.
- B. Contractor shall be responsible for maintaining and providing to Owner clog-free drainage piping. Provide drainage piping flushing with water service on any section so requested by Owner, or his representative.
- C. Place plugs in ends of uncompleted piping at end of each day or when work stops.

**PART 16 - BASIS OF PAYMENT**

The lump sum payment shall include all labor, material, and equipment necessary to complete the work. No additional payment will be made for corrective actions.

Payment will be made under:

<u>Pay Item</u>	<u>Unit</u>
Platform Structure Drainage System	Lump Sum

**END OF SECTION 221423**

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**Mecklenburg County**

**PROJECT SPECIAL PROVISIONS  
ELECTRIC TRACTION**

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**STRUCTURE GROUNDING AND BONDING****(SPECIAL)****GENERAL**

This work includes the furnishing, installing, connecting, and testing of the structure grounding and bonding system for Trade Street Bridge in Mecklenburg County, Station: 23+65.83 -S1-.

**MATERIALS**

1. Grounding and Bonding Equipment: Conform to UL 467 and the additional requirements specified herein.
2. Ground Rods: Medium carbon steel core, copper clad steel ground rods with 10 mil thick copper cladding, copper-clad by the molten weld casting process; size of 3/4 inch in diameter by 10 feet long or as indicated; UL listed.
3. Bare Conductors: ASTM B3, Class B stranded, annealed copper conductor, unless otherwise indicated, size as indicated. Aluminum conductors are prohibited.
4. Fiberglass Insulation Board: glass mat reinforced thermoset polyester molded sheet, flame resistant, arc and track resistant, NEMA grade GPO-3, UL recognized.
5. Accessories:
  - a. Lugs: Select suitable lugs for attaching grounding conductors to equipment or metallic surfaces.
  - b. Use stainless steel or silicon bronze bolts and braided, flexible tin-plated copper jumpers.
6. Exothermic Welding Materials
  - a. Molds: Use synthetic graphite material molds capable of withstanding high temperatures generated during the welding process. Molds shall have permanent marking indicating the name of manufacturer, type and size of welding mixture compatible with the welding process, and the size of cable or bus connection. Select molds furnished with safety information, connection preparation and welding procedure.
  - b. Weld Material: Use weld metal consisting of copper oxide. Weld metal packages shall identify the type of weld metal and metals to be connected.

Supply materials in accordance with the following standards:

American Society for Testing and Materials (ASTM):



ASTM B3 Soft or Annealed Copper Wire

ASTM B187 Copper Bus Bar, Rod, and Shapes

National Fire Protection Association (NFPA):

NFPA 70 National Electrical Code (NEC)

Underwriters Laboratories Inc. (UL):

UL 467 Grounding and Bonding Equipment

National Electrical Manufacturers Association (NEMA):

NEMA GPO-3

Refer to Contract Requirements for Submittals, Shop Drawings, Product Data, and Samples.

Submit shop drawings showing locations of ground rods, grounding connections, and locations of embedded and buried grounding conductors. Drawings shall also indicate locations of test points to measure grounding resistance.

Submit manufacturers' product data of specified, manufactured materials.

Submit copies of certified test reports of grounding resistance tests, including method of measurement.

Adhere to Quality Control applicable codes, Reference Standards and as required in the Contract Documents.

## **DELIVERY STORAGE AND HANDLING**

Provide wire with identification labels or tags on either the wire itself or on the coil, reel or smallest container in which the product is packaged when delivered on the project. Show the manufacturer's name, gauge, UL symbol and type of wire on the identification label or tag. Each item shall have the UL label.

Ship each item of equipment and materials securely wrapped, packaged, and labeled for safe handling in shipment and to avoid damage.

Store equipment and materials in secure and dry storage facility.

## **CONSTRUCTION**

### Installation of Grounding System

1. Ground Connections:

- a. Use mounting or attachment hardware including bolts, nuts, washers, straps, clamps and hangers which is made of stainless steel. Use bolts, which are minimum length and are not less than one minimal size smaller than the opening being used.
  - b. Provide exothermic welding of buried and embedded ground connections as specified in the plans. Compression or mechanical connections underground are prohibited.
  - c. Prior to welding to exposed structural steel, remove protective coating down to base metal at the location of grounding conductor connection. Make welds in accordance with the manufacturer's requirements. Following the completion of the weld, coat welded connections with a bitumastic epoxy coating.
  - d. For above ground connections, install compression type terminal lugs, mechanically bolted connectors, or exothermic welding as indicated on the Contract Drawings. Attach lugs to items grounded with stainless steel or silicon bronze hardware.
  - e. Remove paint and protective coating prior to installation of grounding and bonding hardware to the bridge girders. All grounding and bonding connections need to be in direct contact with the bridge girders.
  - f. Protect grounding conductors from physical and environmental damage. Wherever possible, enclose grounding and bonding conductors in non-metallic raceways. Where conductors are required to be exposed, support grounding conductors by corrosion resistant metallic hardware at 4-foot intervals or less.
  - g. Use bi-metallic strips and oxide inhibiting compound for all mechanical connections where copper to aluminum or copper to steel connections are made. Abrade all contact surfaces prior to application of the inhibiting compound and before attachment of the bolted connection. Apply the compound to all copper, aluminum and steel parts.
  - h. Provide continuous ground conductors without splices, or unnecessary bends and kinds in the conductors.
2. Ground Rods:
- a. Install ground rods as shown on the Contract Drawings. Bury ground rods vertically; the top of ground rods shall be no more than 6 inches below finished grade and shall remain exposed until electrical inspection is complete. If extensive rock formation is encountered, relocate ground rods to a new location.
  - b. Where permanently concealed ground connections are required, make the connections by the exothermic process to form solid metal joints.
  - c. Provide a ground conductor sized in accordance with NFPA 70.

3. Fiberglass Insulation Board:

- a. Install fiberglass insulation boards to the Trade Street Bridge as shown on the Contract Drawings.
- b. Cut laminate sheets to size using diamond- or carbide-tipped saw.

#### Grounding and Bonding Requirements

Provide bridge grounding system that is independent from CityLYNX Gold Line as indicated. Ground metallic conduits, raceways, cable trays, boxes, and exposed expansion joints in accordance with NFPA 70.

Bond and ground all metallic elements of bridge substructure and superstructure as shown on the contract drawings for the Trade Street Bridge Structure.

1. Permanently bond grounding conductor to ground rod using an exothermic weld.
2. Ensure all bolted connections are made using a hydraulic, power or ratcheting type crimper with appropriate dies. Use of handheld pliers for crimping is prohibited.
3. Bond locations shown are approximate, adjust as required to avoid conduits, etc.

#### Exothermic Welding Requirements

1. Use suitable welding cartridges and molds for the type of weld performed. Perform welding in accordance with the manufacturer's recommendations.
2. Place powdered welding metal in the mold along with the conductors to be welded. Ignite the powder to produce molten copper to weld the conductors to a surface.
3. After welds have been completed and cooled, brush slag from the weld area and thoroughly clean the joint.
4. Test all welds by striking with a two (2) pound steel hammer. Replace any defective welds.

#### Field Quality Control Requirements

1. Test the grounding system by the fall-of-potential method. Unless otherwise noted, demonstrate that total ground resistance does not exceed 25 ohms in accordance with the NEC. To meet this resistance requirement, if necessary, bury additional ground rods or use electrolytic ground electrodes.
2. Test the grounding and bonding system for continuity.

#### **BASIS OF PAYMENT**

The lump sum payment shall include all materials, equipment, tools, labor, and incidentals necessary to complete the work.

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Payment will be made under:

<u>Pay Item</u>	<u>Unit</u>
Structure Grounding and Bonding at Sta. 23+65.83 -S1-	Lump Sum

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
<b>ROADWAY ITEMS</b>						
0001	0000100000-N	800	MOBILIZATION	Lump Sum	L.S.	
0002	0000400000-N	801	CONSTRUCTION SURVEYING	Lump Sum	L.S.	
0003	0000500000-N	801	SUPPLEMENTAL FIELD SURVEYING	20 HR		
0004	0000600000-N	801	SUPPLEMENTAL SURVEYING OFFICE CALCULATIONS	10 HR		
0005	0000700000-N	SP	FIELD OFFICE	Lump Sum	L.S.	
0006	0000915000-N	SP	GENERIC MISCELLANEOUS ITEM BOA MOBILIZATION	4 EA		
0007	0001000000-E	200	CLEARING & GRUBBING .. ACRE(S)	Lump Sum	L.S.	
0008	0008000000-E	200	SUPPLEMENTARY CLEARING & GRUBBING	1 ACR		
0009	0022000000-E	225	UNCLASSIFIED EXCAVATION	2,950 CY		
0010	0036000000-E	225	UNDERCUT EXCAVATION	1,300 CY		
0011	0106000000-E	230	BORROW EXCAVATION	29,400 CY		
0012	0156000000-E	250	REMOVAL OF EXISTING ASPHALT PAVEMENT	5,870 SY		
0013	0163000000-E	250	REMOVAL OF EXISTING CONCRETE PAVEMENT	60 SY		
0014	0185000000-E	250	BREAKING OF EXISTING CONCRETE PAVEMENT	880 SY		
0015	0192000000-N	260	PROOF ROLLING	11 HR		
0016	0194000000-E	265	SELECT GRANULAR MATERIAL, CLASS III	84,400 CY		
0017	0196000000-E	270	GEOTEXTILE FOR SOIL STABILIZATION	1,400 SY		
0018	0199000000-E	SP	TEMPORARY SHORING	3,900 SF		

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Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0019	0223000000-E	275	ROCK PLATING	1,015		SY
0020	0248000000-N	SP	GENERIC GRADING ITEM SELECT DEMOLITION OF CONCRETE SHEET PILE WALL	Lump Sum	L.S.	
0021	0248000000-N	SP	GENERIC GRADING ITEM SELECT DEMOLITION OF CRIB WALL	Lump Sum	L.S.	
0022	0255000000-E	SP	GENERIC GRADING ITEM EARTH MOUND	5		TON
0023	0255000000-E	SP	GENERIC GRADING ITEM HAULING AND DISPOSAL OF CONTAMINATED SOIL	4,555		TON
0024	0255000000-E	SP	GENERIC GRADING ITEM SURGE STONE	200		TON
0025	0257000000-E	SP	GENERIC GRADING ITEM RAILROAD SIGNAL CONDUIT	3,000		LF
0026	0318000000-E	300	FOUNDATION CONDITIONING MATE- RIAL, MINOR STRUCTURES	440		TON
0027	0320000000-E	300	FOUNDATION CONDITIONING GEO- TEXTILE	1,000		SY
0028	0335000000-E	305	*** DRAINAGE PIPE (8")	170		LF
0029	0366000000-E	310	15" RC PIPE CULVERTS, CLASS III	324		LF
0030	0372000000-E	310	18" RC PIPE CULVERTS, CLASS III	252		LF
0031	0378000000-E	310	24" RC PIPE CULVERTS, CLASS III	92		LF
0032	0536000000-E	310	**** HDPE PIPE CULVERTS (12")	156		LF
0033	0536000000-E	310	**** HDPE PIPE CULVERTS (15")	280		LF
0034	0536000000-E	310	**** HDPE PIPE CULVERTS (18")	68		LF

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Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0035	0536000000-E	310	**** HDPE PIPE CULVERTS (30")	432 LF		
0036	0995000000-E	340	PIPE REMOVAL	480 LF		
0037	0996000000-N	350	PIPE CLEAN OUT	1 EA		
0038	1011000000-N	500	FINE GRADING	Lump Sum	L.S.	
0039	1099500000-E	505	SHALLOW UNDERCUT	100 CY		
0040	1099700000-E	505	CLASS IV SUBGRADE STABILIZA- TION	200 TON		
0041	1220000000-E	545	INCIDENTAL STONE BASE	225 TON		
0042	1297000000-E	607	MILLING ASPHALT PAVEMENT, **** DEPTH (3")	3,560 SY		
0043	1491000000-E	610	ASPHALT CONC BASE COURSE, TYPE B25.0C	960 TON		
0044	1503000000-E	610	ASPHALT CONC INTERMEDIATE COURSE, TYPE I19.0C	30 TON		
0045	1523000000-E	610	ASPHALT CONC SURFACE COURSE, TYPE S9.5C	940 TON		
0046	1575000000-E	620	ASPHALT BINDER FOR PLANT MIX	105 TON		
0047	1693000000-E	654	ASPHALT PLANT MIX, PAVEMENT REPAIR	245 TON		
0048	2022000000-E	815	SUBDRAIN EXCAVATION	224 CY		
0049	2026000000-E	815	GEOTEXTILE FOR SUBSURFACE DRAINS	1,000 SY		
0050	2036000000-E	815	SUBDRAIN COARSE AGGREGATE	168 CY		
0051	2044000000-E	815	6" PERFORATED SUBDRAIN PIPE	1,000 LF		
0052	2070000000-N	815	SUBDRAIN PIPE OUTLET	2 EA		

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Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0053	2077000000-E	815	6" OUTLET PIPE	12 LF		
0054	2253000000-E	840	PIPE COLLARS	0.66 CY		
0055	2275000000-E	SP	FLOWABLE FILL	36 CY		
0056	2286000000-N	840	MASONRY DRAINAGE STRUCTURES	18 EA		
0057	2308000000-E	840	MASONRY DRAINAGE STRUCTURES	49.3 LF		
0058	2365000000-N	840	FRAME WITH TWO GRATES, STD 840.22	6 EA		
0059	2374000000-N	840	FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (F)	2 EA		
0060	2374000000-N	840	FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (G)	3 EA		
0061	2396000000-N	840	FRAME WITH COVER, STD 840.54	5 EA		
0062	2484000000-E	SP	GENERIC DRAINAGE ITEM 8" UNDERDRAIN	5,250 LF		
0063	2549000000-E	846	2'-6" CONCRETE CURB & GUTTER	600 LF		
0064	2591000000-E	848	4" CONCRETE SIDEWALK	1,440 SY		
0065	2612000000-E	848	6" CONCRETE DRIVEWAY	20 SY		
0066	2800000000-N	858	ADJUSTMENT OF CATCH BASINS	2 EA		
0067	2905000000-N	859	CONVERT EXISTING DROP INLET TO JUNCTION BOX	1 EA		
0068	3030000000-E	862	STEEL BEAM GUARDRAIL	1,350 LF		
0069	3045000000-E	862	STEEL BEAM GUARDRAIL, SHOP CURVED	300 LF		
0070	3105000000-N	862	STEEL BEAM GUARDRAIL TERMINAL SECTIONS	8 EA		



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Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0071	3150000000-N	862	ADDITIONAL GUARDRAIL POSTS	5 EA		
0072	3210000000-N	862	GUARDRAIL END UNITS, TYPE CAT-1	4 EA		
0073	3533000000-E	866	CHAIN LINK FENCE, *** FABRIC (72")	1,183 LF		
0074	3536000000-E	866	CHAIN LINK FENCE, 48" FABRIC	193 LF		
0075	3539000000-E	866	METAL LINE POSTS FOR *** CHAIN LINK FENCE (72")	102 EA		
0076	3542000000-E	866	METAL LINE POSTS FOR 48" CHAIN LINK FENCE	17 EA		
0077	3545000000-E	866	METAL TERMINAL POSTS FOR *** CHAIN LINK FENCE (72")	10 EA		
0078	3548000000-E	866	METAL TERMINAL POSTS FOR 48" CHAIN LINK FENCE	6 EA		
0079	3551000000-E	866	METAL GATE POSTS FOR *** CHAIN LINK FENCE, SINGLE GATE (72")	2 EA		
0080	3554000000-E	866	METAL GATE POSTS FOR *** CHAIN LINK FENCE, DOUBLE GATE (72")	2 EA		
0081	3564000000-E	866	SINGLE GATES, *** HIGH, *** WIDE, *** OPENING (72", 12', 12')	1 EA		
0082	3565000000-E	866	DOUBLE GATES, *** HIGH, *** WIDE, *** OPENING (72", 12', 24')	1 EA		
0083	3578000000-N	SP	GENERIC FENCING ITEM GATE	2 EA		
0084	3649000000-E	876	RIP RAP, CLASS B	18 TON		
0085	3656000000-E	876	GEOTEXTILE FOR DRAINAGE	795 SY		
0086	3832000000-E	SP	RAILROAD TRACK TO BE REMOVED	3,740 TF		

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Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0087	3884000000-N	SP	GENERIC TRACKWORK ITEM CROSSTIE DISPOSAL	2,120 EA		
0088	3885000000-E	SP	GENERIC TRACKWORK ITEM SUB-BALLAST	6,615 TON		
0089	4072000000-E	903	SUPPORTS, 3-LB STEEL U-CHANNEL	49 LF		
0090	4102000000-N	904	SIGN ERECTION, TYPE E	1 EA		
0091	4116100000-N	904	SIGN ERECTION, RELOCATE TYPE **** (GROUND MOUNTED) (E)	4 EA		
0092	4155000000-N	907	DISPOSAL OF SIGN SYSTEM, U- CHANNEL	2 EA		
0093	4192000000-N	907	DISPOSAL OF SUPPORT, U-CHANNEL	2 EA		
0094	4238000000-N	907	DISPOSAL OF SIGN, D, E OR F	4 EA		
0095	4400000000-E	1110	WORK ZONE SIGNS (STATIONARY)	421 SF		
0096	4410000000-E	1110	WORK ZONE SIGNS (BARRICADE MOUNTED)	173 SF		
0097	4415000000-N	1115	FLASHING ARROW BOARD	2 EA		
0098	4420000000-N	1120	PORTABLE CHANGEABLE MESSAGE SIGN	2 EA		
0099	4430000000-N	1130	DRUMS	50 EA		
0100	4445000000-E	1145	BARRICADES (TYPE III)	208 LF		
0101	4455000000-N	1150	FLAGGER	30 DAY		
0102	4465000000-N	1160	TEMPORARY CRASH CUSHIONS	2 EA		
0103	4470000000-N	1160	REMOVE & RESET TEMPORARY CRASH CUSHION	2 EA		
0104	4485000000-E	1170	PORTABLE CONCRETE BARRIER	275 LF		

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Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0105	4500000000-E	1170	REMOVE & RESET PORTABLE CONCRETE BARRIER	373 LF		
0106	4507000000-E	1170	WATER FILLED BARRIER	224 LF		
0107	4516000000-N	1180	SKINNY DRUM	30 EA		
0108	4685000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (4", 90 MILS)	100 LF		
0109	4810000000-E	1205	PAINT PAVEMENT MARKING LINES (4")	1,300 LF		
0110	4847010000-E	1205	POLYUREA PAVEMENT MARKING LINES (4", 20 MILS)	1,000 LF		
0111	4850000000-E	1205	REMOVAL OF PAVEMENT MARKING LINES (4")	100 LF		
0112	4915000000-E	1264	7' U-CHANNEL POSTS	3 EA		
0113	4955000000-N	1264	OBJECT MARKERS (END OF ROAD)	3 EA		
0114	5325600000-E	1510	6" WATER LINE	109 LF		
0115	5325800000-E	1510	8" WATER LINE	14 LF		
0116	5326200000-E	1510	12" WATER LINE	372 LF		
0117	5327000000-E	1510	20" WATER LINE	60 LF		
0118	5329000000-E	1510	DUCTILE IRON WATER PIPE FITTINGS	3,100 LB		
0119	5540000000-E	1515	6" VALVE	2 EA		
0120	5558000000-E	1515	12" VALVE	2 EA		
0121	5606000000-E	1515	2" BLOW OFF	1 EA		
0122	5648000000-N	1515	RELOCATE WATER METER	1 EA		
0123	5649000000-N	1515	RECONNECT WATER METER	1 EA		

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Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0124	5672000000-N	1515	RELOCATE FIRE HYDRANT	1 EA		
0125	5673000000-E	1515	FIRE HYDRANT LEG	17 LF		
0126	5678400000-E	1515	6" LINE STOP	2 EA		
0127	5678600000-E	1515	8" LINE STOP	2 EA		
0128	5686500000-E	1515	WATER SERVICE LINE	29 LF		
0129	5691500000-E	1520	12" SANITARY GRAVITY SEWER	143 LF		
0130	5691900000-E	1520	24" SANITARY GRAVITY SEWER	504 LF		
0131	5775000000-E	1525	4' DIA UTILITY MANHOLE	2 EA		
0132	5776000000-E	1525	5' DIA UTILITY MANHOLE	4 EA		
0133	5781000000-E	1525	UTILITY MANHOLE WALL 4' DIA	4 LF		
0134	5782000000-E	1525	UTILITY MANHOLE WALL 5' DIA	10 LF		
0135	5800000000-E	1530	ABANDON 6" UTILITY PIPE	418 LF		
0136	5801000000-E	1530	ABANDON 8" UTILITY PIPE	919 LF		
0137	5802000000-E	1530	ABANDON 10" UTILITY PIPE	227 LF		
0138	5811000000-E	1530	ABANDON 18" UTILITY PIPE	524 LF		
0139	5815000000-N	1530	REMOVE WATER METER	9 EA		
0140	5816000000-N	1530	ABANDON UTILITY MANHOLE	6 EA		
0141	5828000000-N	1530	REMOVE UTILITY MANHOLE	3 EA		
0142	5888000000-E	SP	GENERIC UTILITY ITEM 8" CURED IN PLACE PIPE	517 LF		
0143	6000000000-E	1605	TEMPORARY SILT FENCE	7,200 LF		

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Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0144	6006000000-E	1610	STONE FOR EROSION CONTROL, CLASS A	330 TON		
0145	6009000000-E	1610	STONE FOR EROSION CONTROL, CLASS B	1,970 TON		
0146	6012000000-E	1610	SEDIMENT CONTROL STONE	1,160 TON		
0147	6015000000-E	1615	TEMPORARY MULCHING	15 ACR		
0148	6018000000-E	1620	SEED FOR TEMPORARY SEEDING	700 LB		
0149	6021000000-E	1620	FERTILIZER FOR TEMPORARY SEED- ING	3.5 TON		
0150	6024000000-E	1622	TEMPORARY SLOPE DRAINS	1,850 LF		
0151	6029000000-E	SP	SAFETY FENCE	500 LF		
0152	6030000000-E	1630	SILT EXCAVATION	3,700 CY		
0153	6036000000-E	1631	MATTING FOR EROSION CONTROL	28,000 SY		
0154	6037000000-E	SP	COIR FIBER MAT	50 SY		
0155	6042000000-E	1632	1/4" HARDWARE CLOTH	1,000 LF		
0156	6071012000-E	SP	COIR FIBER WATTLE	1,050 LF		
0157	6071020000-E	SP	POLYACRYLAMIDE (PAM)	500 LB		
0158	6071030000-E	1640	COIR FIBER BAFFLE	1,200 LF		
0159	6084000000-E	1660	SEEDING & MULCHING	6 ACR		
0160	6087000000-E	1660	MOWING	6 ACR		
0161	6090000000-E	1661	SEED FOR REPAIR SEEDING	150 LB		
0162	6093000000-E	1661	FERTILIZER FOR REPAIR SEEDING	0.75 TON		
0163	6096000000-E	1662	SEED FOR SUPPLEMENTAL SEEDING	425 LB		

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0164	6108000000-E	1665	FERTILIZER TOPDRESSING	12.25	TON	
0165	6114500000-N	1667	SPECIALIZED HAND MOWING	30	MHR	
0166	6117000000-N	SP	RESPONSE FOR EROSION CONTROL	100	EA	
0167	6117500000-N	SP	CONCRETE WASHOUT STRUCTURE	5	EA	
0168	6132000000-N	SP	GENERIC EROSION CONTROL ITEM SUPPLEMENTAL RESPONSE FOR EROSION CONTROL	10	EA	
0292	3575000000-E	SP	GENERIC FENCING ITEM TEMP CHAIN LINK FENCE, 60" FABRIC	195	LF	
0293	3575000000-E	SP	GENERIC FENCING ITEM DECORATIVE FENCE RESET	50	LF	

**CULVERT ITEMS**

0169	8126000000-N	414	CULVERT EXCAVATION, STA ***** (25+30.89-S1-)	Lump Sum	L.S.	
0170	8126000000-N	414	CULVERT EXCAVATION, STA ***** (29+35.21-S1-)	Lump Sum	L.S.	
0171	8126000000-N	414	CULVERT EXCAVATION, STA ***** (42+05.33-A1-)	Lump Sum	L.S.	
0172	8133000000-E	414	FOUNDATION CONDITIONING MATER- IAL, BOX CULVERT	177	TON	
0173	8245000000-E	425	REINFORCING STEEL (CULVERT)	158,630	LB	
0174	8453000000-E	454	METHOD B DAMPPROOFING	17.6	SY	
0175	8806000000-N	SP	GENERIC CULVERT ITEM PDA TESTING	2	EA	
0176	8806000000-N	SP	GENERIC CULVERT ITEM PILE DRIVING EQUIPMENT SETUP FOR HP14X73 STEEL PILES	43	EA	

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0177	8811000000-E	SP	GENERIC CULVERT ITEM HP14X73 STEEL PILES	1,602 LF		
0178	8811000000-E	SP	GENERIC CULVERT ITEM METAL RAIL (ALUMINUM)	47.2 LF		
0179	8822000000-E	SP	GENERIC CULVERT ITEM WATERPROOFING	562 SY		
0180	8826000000-E	420	GENERIC CULVERT ITEM CLASS AA CONCRETE	646.6 CY		

**WALL ITEMS**

0181	8077000000-E	410	FOUNDATION EXCAVATION (RETAIN- ING WALL)	2,693.7 CY		
0182	8252000000-E	425	REINFORCING STEEL (RETAINING WALL)	382,579 LB		
0183	8453000000-E	454	METHOD B DAMPPROOFING	905.2 SY		
0184	8834000000-N	SP	GENERIC RETAINING WALL ITEM 7" DIA MICROPILES	6 EA		
0185	8834000000-N	SP	GENERIC RETAINING WALL ITEM MICROPILE VERIFICATION TEST	1 EA		
0186	8834000000-N	SP	GENERIC RETAINING WALL ITEM PDA TESTING	2 EA		
0187	8834000000-N	SP	GENERIC RETAINING WALL ITEM PILE DRIVING EQUIPMENT SETUP FOR HP14X73 STEEL PILES	316 EA		
0188	8839000000-E	SP	GENERIC RETAINING WALL ITEM HP14X73 STEEL PILES	11,113.4 LF		
0189	8839000000-E	SP	GENERIC RETAINING WALL ITEM METAL RAIL (ALUMINUM)	594.4 LF		
0190	8839000000-E	SP	GENERIC RETAINING WALL ITEM METAL RAIL (STEEL) & FENCE	1,320.1 LF		

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0191	8847000000-E	SP	GENERIC RETAINING WALL ITEM PILE PANEL RETAINING WALLS	10,304.8 SF		
0192	8853000000-E	SP	GENERIC RETAINING WALL ITEM CLASS AA CONCRETE	2,296.9 CY		

**STRUCTURE ITEMS**

0193	8035000000-N	402	REMOVAL OF EXISTING STRUCTURE AT STATION ***** (15+39.55-S1-)	Lump Sum	L.S.	
0194	8035000000-N	402	REMOVAL OF EXISTING STRUCTURE AT STATION ***** (23+62.98-S2-)	Lump Sum	L.S.	
0195	8035000000-N	402	REMOVAL OF EXISTING STRUCTURE AT STATION ***** (28+12.88-S2-)	Lump Sum	L.S.	
0196	8035000000-N	402	REMOVAL OF EXISTING STRUCTURE AT STATION ***** (42+59.46-A1-)	Lump Sum	L.S.	
0197	8070000000-E	410	FOUNDATION EXCAVATION (BRIDGE)	1,600 CY		
0198	8091000000-N	410	FOUNDATION EXCAVATION FOR BENT ** AT STATION ***** (PIER 1, 18+79.37-S2-)	Lump Sum	L.S.	
0199	8091000000-N	410	FOUNDATION EXCAVATION FOR BENT ** AT STATION ***** (PIER 1, 23+62.98-S2-)	Lump Sum	L.S.	
0200	8091000000-N	410	FOUNDATION EXCAVATION FOR BENT ** AT STATION ***** (PIER 1, 28+12.88-S2-)	Lump Sum	L.S.	
0201	8091000000-N	410	FOUNDATION EXCAVATION FOR BENT ** AT STATION ***** (PIER 2, 18+79.37-S2-)	Lump Sum	L.S.	
0202	8091000000-N	410	FOUNDATION EXCAVATION FOR BENT ** AT STATION ***** (PIER 2, 28+12.88-S2-)	Lump Sum	L.S.	



Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0203	8091000000-N	410	FOUNDATION EXCAVATION FOR BENT ** AT STATION ***** (PIER 3, 23+62.98-S2-)	Lump Sum	L.S.	
0204	8105500000-E	411	***_*** DIA DRILLED PIERS IN SOIL (4'-6")	84.5 LF		
0205	8105500000-E	411	***_*** DIA DRILLED PIERS IN SOIL (6'-0")	366.5 LF		
0206	8105600000-E	411	***_*** DIA DRILLED PIERS NOT IN SOIL (4'-6")	86 LF		
0207	8105600000-E	411	***_*** DIA DRILLED PIERS NOT IN SOIL (5'-6")	407 LF		
0208	8105600000-E	411	***_*** DIA DRILLED PIERS NOT IN SOIL (6'-0")	90 LF		
0209	8111000000-E	411	PERMANENT STEEL CASING FOR ***_*** DIA DRILLED PIER (6'-0")	193.4 LF		
0210	8113000000-N	411	SID INSPECTIONS	20 EA		
0211	8114000000-N	411	SPT TESTING	20 EA		
0212	8115000000-N	411	CSL TESTING	20 EA		
0213	8121000000-N	412	UNCLASSIFIED STRUCTURE EXCAVA- TION AT STATION ***** (42+59.46-A1-)	Lump Sum	L.S.	
0214	8147000000-E	420	REINFORCED CONCRETE DECK SLAB	35,454.2 SF		
0215	8175000000-E	420	CLASS AA CONCRETE (BRIDGE)	7,887.6 CY		
0216	8217000000-E	425	REINFORCING STEEL (BRIDGE)	1,684,508 LB		
0217	8238000000-E	425	SPIRAL COLUMN REINFORCING STEEL (BRIDGE)	84,013 LB		
0218	8453000000-E	454	METHOD B DAMPPROOFING	1,690.8 SY		

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0219	8531000000-E	462	4" SLOPE PROTECTION	1,482.8 SY		
0220	8608000000-E	876	RIP RAP CLASS II (2'-0" THICK)	975 TON		
0221	8622000000-E	876	GEOTEXTILE FOR DRAINAGE	1,085 SY		
0222	8657000000-N	430	ELASTOMERIC BEARINGS	Lump Sum	L.S.	
0223	8860000000-N	SP	GENERIC STRUCTURE ITEM APPLICATION OF BRIDGE COATING	Lump Sum	L.S.	
0224	8860000000-N	SP	GENERIC STRUCTURE ITEM APPROX 160,000 LBS STRUCTURAL STEEL	Lump Sum	L.S.	
0225	8860000000-N	SP	GENERIC STRUCTURE ITEM APPROX 177,727 LBS STRUCTURAL STEEL	Lump Sum	L.S.	
0226	8860000000-N	SP	GENERIC STRUCTURE ITEM APPROX 177,963 LBS STRUCTURAL STEEL	Lump Sum	L.S.	
0227	8860000000-N	SP	GENERIC STRUCTURE ITEM APPROX 231,350 LBS STRUCTURAL STEEL	Lump Sum	L.S.	
0228	8860000000-N	SP	GENERIC STRUCTURE ITEM APPROX 233,588 LBS STRUCTURAL STEEL STA 28+12.88-S2-	Lump Sum	L.S.	
0229	8860000000-N	SP	GENERIC STRUCTURE ITEM APPROX 233,588 LBS STRUCTURAL STEEL STA 28+17.22-S1-	Lump Sum	L.S.	
0230	8860000000-N	SP	GENERIC STRUCTURE ITEM APPROX 338,035 LBS STRUCTURAL STEEL STA 23+62.98-S2-	Lump Sum	L.S.	
0231	8860000000-N	SP	GENERIC STRUCTURE ITEM APPROX 338,035 LBS STRUCTURAL STEEL STA 23+65.83-S1-	Lump Sum	L.S.	
0232	8860000000-N	SP	GENERIC STRUCTURE ITEM APPROX 764,875 LBS STRUCTURAL STEEL	Lump Sum	L.S.	

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Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0233	8860000000-N	SP	GENERIC STRUCTURE ITEM ASBESTOS ASSESSMENT	Lump Sum	L.S.	
0234	8860000000-N	SP	GENERIC STRUCTURE ITEM PAINTING OF STRUCTURAL STEEL	Lump Sum	L.S.	
0235	8860000000-N	SP	GENERIC STRUCTURE ITEM PLATFORM STRUCTURE DRAINAGE SYSTEM	Lump Sum	L.S.	
0236	8860000000-N	SP	GENERIC STRUCTURE ITEM SELF LUBRICATING EXPANSION BEARING ASSEMBLIES	Lump Sum	L.S.	
0237	8860000000-N	SP	GENERIC STRUCTURE ITEM STRUCTURE DRAINAGE SYSTEM AT STA 15+39.55-S1-	Lump Sum	L.S.	
0238	8860000000-N	SP	GENERIC STRUCTURE ITEM STRUCTURE DRAINAGE SYSTEM AT STA 18+79.37-S2-	Lump Sum	L.S.	
0239	8860000000-N	SP	GENERIC STRUCTURE ITEM STRUCTURE DRAINAGE SYSTEM AT STA 18+82.25-S1-	Lump Sum	L.S.	
0240	8860000000-N	SP	GENERIC STRUCTURE ITEM STRUCTURE DRAINAGE SYSTEM AT STA 23+62.98-S2-	Lump Sum	L.S.	
0241	8860000000-N	SP	GENERIC STRUCTURE ITEM STRUCTURE DRAINAGE SYSTEM AT STA 23+65.83-S1-	Lump Sum	L.S.	
0242	8860000000-N	SP	GENERIC STRUCTURE ITEM STRUCTURE DRAINAGE SYSTEM AT STA 28+12.88-S2-	Lump Sum	L.S.	
0243	8860000000-N	SP	GENERIC STRUCTURE ITEM STRUCTURE DRAINAGE SYSTEM AT STA 28+17.22-S1-	Lump Sum	L.S.	
0244	8860000000-N	SP	GENERIC STRUCTURE ITEM STRUCTURE DRAINAGE SYSTEM AT STA 42+59.46-A1-	Lump Sum	L.S.	
0245	8860000000-N	SP	GENERIC STRUCTURE ITEM STRUCTURE GROUNDING AND BONDING AT STA 23+65.83-S1-	Lump Sum	L.S.	

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Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0246	8860000000-N	SP	GENERIC STRUCTURE ITEM TEMPORARY RAILROAD SHORING/ ABUTMENT 1 (23+62.98-S2-)	Lump Sum	L.S.	
0247	8860000000-N	SP	GENERIC STRUCTURE ITEM TEMPORARY RAILROAD SHORING/ ABUTMENT 1 (28+12.88-S2-)	Lump Sum	L.S.	
0248	8860000000-N	SP	GENERIC STRUCTURE ITEM TEMPORARY RAILROAD SHORING/ ABUTMENT 1 (42+59.46-A1-)	Lump Sum	L.S.	
0249	8860000000-N	SP	GENERIC STRUCTURE ITEM TEMPORARY RAILROAD SHORING/ ABUTMENT 2 (23+62.98-S2-)	Lump Sum	L.S.	
0250	8860000000-N	SP	GENERIC STRUCTURE ITEM TEMPORARY RAILROAD SHORING/ ABUTMENT 2 (28+12.88-S2-)	Lump Sum	L.S.	
0251	8860000000-N	SP	GENERIC STRUCTURE ITEM TEMPORARY RAILROAD SHORING/ ABUTMENT 2 (42+59.46-A1-)	Lump Sum	L.S.	
0252	8860000000-N	SP	GENERIC STRUCTURE ITEM TEMPORARY RAILROAD SHORING/ PIER 1 (18+79.37-S2-)	Lump Sum	L.S.	
0253	8860000000-N	SP	GENERIC STRUCTURE ITEM TEMPORARY RAILROAD SHORING/ PIER 1 (23+62.98-S2-)	Lump Sum	L.S.	
0254	8860000000-N	SP	GENERIC STRUCTURE ITEM TEMPORARY RAILROAD SHORING/ PIER 1 (28+12.88-S2-)	Lump Sum	L.S.	
0255	8860000000-N	SP	GENERIC STRUCTURE ITEM TEMPORARY RAILROAD SHORING/ PIER 2 (18+79.37-S2-)	Lump Sum	L.S.	
0256	8860000000-N	SP	GENERIC STRUCTURE ITEM TEMPORARY RAILROAD SHORING/ PIER 2 (28+12.88-S2-)	Lump Sum	L.S.	
0257	8860000000-N	SP	GENERIC STRUCTURE ITEM TEMPORARY RAILROAD SHORING/ PIER 3 (23+62.98-S2-)	Lump Sum	L.S.	
0258	8867000000-E	SP	GENERIC STRUCTURE ITEM ABRASIVE METAL NOSINGS	999 LF		

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Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0259	8867000000-E	SP	GENERIC STRUCTURE ITEM ARCHITECTURAL FIN RAIL (ALUMINUM HAND RAIL AND FIN ASSEMBLY)	400.4 LF		
0260	8867000000-E	SP	GENERIC STRUCTURE ITEM ARMORLESS EXPANSION JOINT SYSTEM	335 LF		
0261	8867000000-E	SP	GENERIC STRUCTURE ITEM CONCRETE PARAPET	2,205.2 LF		
0262	8867000000-E	SP	GENERIC STRUCTURE ITEM HP14X73 STEEL PILES	27,972.7 LF		
0263	8867000000-E	SP	GENERIC STRUCTURE ITEM METAL RAIL (ALUMINUM)	842.7 LF		
0264	8867000000-E	SP	GENERIC STRUCTURE ITEM METAL RAIL (STEEL) & FENCE	660.4 LF		
0265	8867000000-E	SP	GENERIC STRUCTURE ITEM PLATFORM EXPANSION JOINTS	315 LF		
0266	8867000000-E	SP	GENERIC STRUCTURE ITEM PLATFORM PAINT	2,200 LF		
0267	8867000000-E	SP	GENERIC STRUCTURE ITEM PREDRILLING FOR PILES	128 LF		
0268	8867000000-E	SP	GENERIC STRUCTURE ITEM RUB RAIL	2,200 LF		
0269	8867000000-E	SP	GENERIC STRUCTURE ITEM SOIL/ROCK BORING	640 LF		
0270	8867000000-E	SP	GENERIC STRUCTURE ITEM STAINLESS STEEL HANDRAILS	370 LF		
0271	8867000000-E	SP	GENERIC STRUCTURE ITEM STAINLESS STEEL RAILINGS	368 LF		
0272	8867000000-E	SP	GENERIC STRUCTURE ITEM TACTILE WARNING SURFACE	2,200 LF		
0273	8889000000-E	SP	GENERIC STRUCTURE ITEM REINFORCING STEEL, BLACK (GRADE 75)	139,300 LB		

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Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0274	8889000000-E	SP	GENERIC STRUCTURE ITEM REINFORCING STEEL, GALVANIZED (GRADE 75)	67,320 LB		
0275	8889000000-E	SP	GENERIC STRUCTURE ITEM SPIRAL REINFORCING STEEL, BLACK (GRADE 75)	69,800 LB		
0276	8889000000-E	SP	GENERIC STRUCTURE ITEM SPIRAL REINFORCING STEEL, GALVANIZED (GRADE 75)	18,000 LB		
0277	8892000000-E	SP	GENERIC STRUCTURE ITEM LIQUID FLOOR TREATMENTS	38,400 SF		
0278	8892000000-E	SP	GENERIC STRUCTURE ITEM STAINLESS STEEL ENCLOSURE	442 SF		
0279	8893000000-E	SP	GENERIC STRUCTURE ITEM FOUNDATION WATERPROOFING	2,400 SY		
0280	8893000000-E	SP	GENERIC STRUCTURE ITEM WATERPROOFING	3,048.2 SY		
0281	8897000000-N	SP	GENERIC STRUCTURE ITEM 3'-6" STAINLESS STEEL GATES	3 EA		
0282	8897000000-N	SP	GENERIC STRUCTURE ITEM 7" DIA MICROPILES	12 EA		
0283	8897000000-N	SP	GENERIC STRUCTURE ITEM 8'-0" STAINLESS STEEL GATES	2 EA		
0284	8897000000-N	SP	GENERIC STRUCTURE ITEM HINGE	30 EA		
0285	8897000000-N	SP	GENERIC STRUCTURE ITEM LIGHTNING PROTECTION SYSTEM	2 EA		
0286	8897000000-N	SP	GENERIC STRUCTURE ITEM MICROPILE VERIFICATION TEST	1 EA		
0287	8897000000-N	SP	GENERIC STRUCTURE ITEM PANIC DEVICE	4 EA		
0288	8897000000-N	SP	GENERIC STRUCTURE ITEM PDA TESTING	20 EA		

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Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0289	8897000000-N	SP	GENERIC STRUCTURE ITEM PILE DRIVING EQUIPMENT SETUP FOR HP14X73 STEEL PILES	593 EA		
0290	8897000000-N	SP	GENERIC STRUCTURE ITEM STEEL PILE POINTS	12 EA		
0291	8897000000-N	SP	GENERIC STRUCTURE ITEM THERMAL INTEGRITY PROFILER	20 EA		
1452/May22/Q3012083.06/D1647933887000/E293			Total Amount Of Bid For Entire Project :			